3D WORLD

THE MAGAZINE FOR 3D ARTISTS

animal magic

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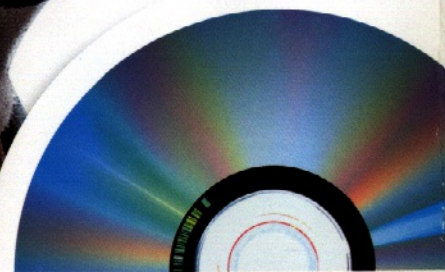
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+

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COVER ARTIST

DreamWorks SKG

IF ANY COMPANY WAS GOING to challenge Pixar for supremacy in the area of cutting-edge 3D films, it was DreamWorks SKG. And that's just what it has managed, often appealing to a more mature audience than that of, say, *Toy Story*.

1998's *Antz* was the studio's first real foray into three dimensions, going up almost directly against Pixar's *A Bug's Life* and demonstrating that animation needn't just be for preteens. But it was *Shrek*, of course, that really broke the mould (and the box-office records), transforming DreamWorks into a 3D force to be reckoned with.

Ironically, having moved away from the medium, the company's latest feature *Madagascar* relies on a staple of cel animation: squash and stretch. The technique may be a given in 2D, but in 3D it required a major rethink of character rigging, constraints and the usual realism-based approach of most setups.

"With anatomically based models you have to be aware that each joint has a limit," says Rex Grignon, Head of Character Animation on *Madagascar*. "Here we could bend an elbow 90 degrees backwards or forwards. The real breakthrough is that the skin follows it all. You can do anything with these guys and it still looks great."

Whether this approach will bear fruit at the box office remains to be seen. But for the moment at least, it would seem that DreamWorks is happy to remain in the vanguard of 3D animation. For more on how the studio went wild with squash and stretch, turn to page 64.

[w] www.dreamworks.com
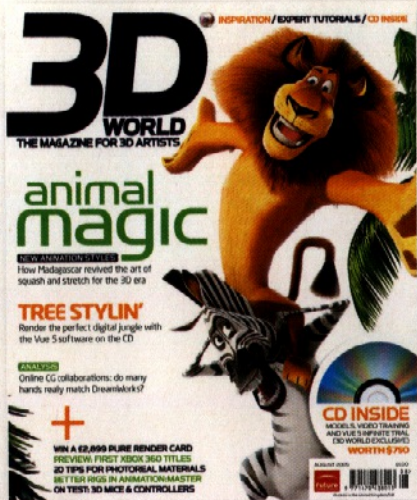
animal magic

Tree style

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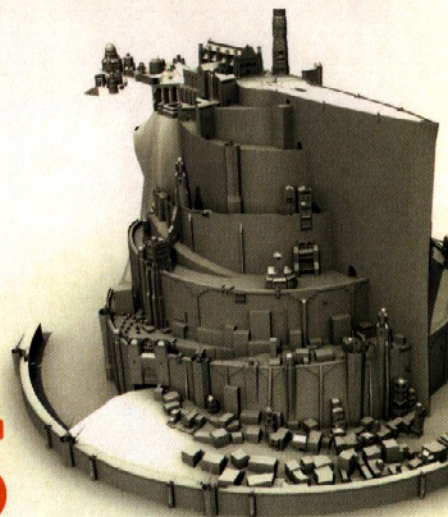
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ON THE CD

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SEE PAGE 114

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Editor's perspective

A friend of mine once rather bitterly commented that the great benefit of families is that they allow many people to suffer for the price of one. Granted, his own experience of family life may not have been entirely typical, but his central point was valid: a family is an organic unit, and if one member is unhappy, it affects everyone else in the household.

So what has this to do with 3D? If you hang on for another couple of paragraphs, I'll come to that. Because in recent months, we've noticed a huge increase in the number of emails we get asking for information on collaborative online CG projects. Online collaboration is, on the face of it, a Very Good Thing. Failed to find backers for your animated re-enactment of *Einstein on the Beach*, starring a cast of singing aliens in place of the Philip Glass Ensemble? Simple. Just put out a call for volunteers on the major forums, and Bob's your uncle. (Or, in this case, Albert is.) Once you've recruited enough staff, you can give them directions and let them work remotely in their spare time, monitoring progress via email, online review and instant messaging. No need for the tedious day-to-day hassles of a real business – such as premises, an IT budget, or having to pay people's salaries.

The other good thing about online collaborations is that they can offer relative novices the chance to get their names on the credits of major productions. Take the recent fan film *Star Wars: Revelations*. In this case, a small team of visual effects artists, working entirely in their own spare time, managed not only to make a 40-minute feature, but to get it covered on CNN, CBS and MSNBC. It may not quite be *Revenge of the Sith* – but for a budget of just £20,000, you'd have to say that it's pretty impressive.

But – and here's where we bravely rejoin the original theme of this column – online collaboration isn't all a bed of roses. Even assuming that you can find enough Philip Glass fans who know one end of an Ewok from another, you've still got to keep them happy throughout the course of the production. And in this, a collab team is very much like a family: a bunch of disparate people, with differing tastes and personalities, loosely united by their shared experience. If you thought your family rows were bad, you probably haven't tried to conduct them online yet.

In our feature on page 32, we take a look an the whole business of online collaboration, and offer some pointers for making things run more smoothly. But who are we to talk? Because this month, another member of the *3D World* family flies the nest. Our Production Editor, Sarah Rosenberg, exhausted by a long and valiant struggle with the capital letters in phrases like 'Add a Mask map to the Opacity slot and a Gradient map to both the masks' slots' is heading off to work on *Quick & Easy Cross Stitch*. Sarah leaves us for a better life sub-editing stitching patterns, and thinking up interesting new ways to say 'recreate this picture of a lovely fluffy teddy bear'. I don't know: you bring them up, you shower them with love and affection, and they never phone, they never write…

JIM THACKER Editor
jim.thacker@futurenet.co.uk

LETTER OF THE MONTH

As well as indulging in 3D, I collect and paint fantasy miniatures (less of your groans, please - I do have a point to make). Because it was while working on designs for props to use with my miniatures that I had a disturbing vision of the future...

As we all know, over the years, 3D has entered and dominated many areas of the media. As enthusiasts, we've always encouraged its unstoppable march because we know that, if done properly, CG can stimulate creativity.

But now, this has all come a bit too close to home for my liking. At the minute, 3D printers can only print layers measuring around one quarter of a millimetre. But soon, they will be able to print at an incredible one-micron level.

This may mean that sculptors of fantasy miniatures will be replaced by 3D modellers who print off their models with such a printer, ready to be cast in metal.

Miniatures that haven't been sculpted by hand? Being a collector, that sounds like blasphemy to me. But when one modeller can do the work of five or more in-house sculptors, what's to stop a manufacturer from hiring them? They're businesses, after all, and in business, money talks.

Of course, those in-house sculptors may then set up on their own and, without a large company intruding on their work, they will start to produce some amazing work. We may even see a golden age of indie miniature making. But without an influx of young blood, their skills will not be passed on to other artists, and the tradition of 'old-fashioned' sculpting will eventually die out.

So am I going to end up buying miniatures created with 3D software? Being a 3D user myself, I should support them. But will I?

Hermit | Via the forum

This posting prompted a lively discussion on the forum, including a reply from former Wizards of the Coast and i-Kore

● A fantasy miniature created by professional sculptor and forum user Kevin White. But could even such unexpected industries be under threat from the rise of 3D?

sculptor Kevin White, now running his own company, **www.hasslefreeminiatures.co.uk**. He commented: "As a sculptor myself, I think the results will only be as good as the user. I have no doubt that someone could produce the sort of miniatures I currently produce by hand on a PC. But why should *I* change my means of production? It takes me, on average, 12 hours to make a 28mm scale miniature. I have no idea what it would take me to do the same thing on a computer, but one person I've spoken to in the games industry says he can spend weeks designing a single 3D model!

"Sure, you could then make hundreds of variants from that design, but that's not what the miniature-buying public want. If they want differences in their toys, they have to be real differences: not just the addition of a new plate of armour or wayward lock of hair. As I see it, to create something sufficiently different, the designer would have to spend as much time altering the original design as I would creating a new miniature. I'm not saying that a miniature designed in a virtual environment will never be as good as one I make in real life - but I do think it will be a long time before it is financially viable for a sculptor to work in this way."

Do you agree with Kevin's analysis? Is there really such a thing as 3D coming too close to home? Answers to the usual address. In the mean time, a copy of *Machineflesh* is on its way to our lucky winner.

● The new *3D World* website: an "inspired move" or mere pawn in *Computer Arts'* evil world-domination plans?

SITE FOR SORE EYES

> I've been watching with interest as *3D World* has moved from a more general to a more industry-oriented magazine. For me, there's been one up and one downside to this. One really significant move is the new website. After complaining previously that the online presence of the mag was woefully behind that enjoyed by those of us familiar with scientific literature, it was with great joy that I explored the new site. Opening up the tutorials and features in conjunction with the search engine effectively liberates me from

trawling through the piles of magazines I have accumulated, and making all of this content free for subscribers was inspired – especially since we now have access to *Computer Arts'* articles as well.

One casualty of the move appears to have been *trueSpace* - so I was heartened to see both an image from *trueSpace* in a recent issue, and a Q&A featured in the current one. It is easy to forget that *trueSpace* was the first Windows-based 3D package, bringing with it many features that were subsequently copied by the current market leaders.

With *trueSpace 7* due out soon, I entertain the hope that the package will feature more regularly in *3D World* in its next incarnation.

Chris Barker | Via email

Thanks for all your feedback about the website, both welcoming the new content, and from those of you who felt that it was in danger of becoming a satellite of *Computer Arts*. As we said at the time of the launch, there are no plans to merge the unique elements of the old site, such as the forum - and, if anything, our experience to date suggests that the new portal structure is bringing *3D World* to the attention of readers who were not previously aware of the magazine. As for *trueSpace*, the software will continue to feature in our Q&A and reviews sections.

STUCK IN THE AGE GAP

> I am a professional graphic designer and have been for the last 20 years. My interest in 3D started about five years ago when I got my mitts on *Cinema 4D*. Wanting to do character animation, and being a bit of a cartoonist, I then switched to *Animation: Master*. I experimented

briefly with *Maya*, but found it a bit complicated.

I've tentatively tried to find work in the games market, but didn't get anywhere since I have no experience. I've also been working on a project of my own for the last few years, but haven't got very far with selling the concept.

So my question is this: at the age of 41, am I wasting my time in trying to pursue a career in CG? Since there seems to be so much competition out there, should I just stick with being a happy hobbyist?

Gazzamataz | Via the forum

Again, this message generated a long thread when it was posted on the forum, including this reply from Zap_Brannigan: "Having been doing animation professionally for six or seven years, I've seen a lot of people struggle with the notion that, as they get older, they should be aiming towards a more stable profession. This is a pretty young industry, and it's not easy trying to make time for

Is mobile 3D finally on the move?

Two years ago, experts predicted that by 2005, 3D games on mobile devices would be everywhere. They were premature – yet recent stirrings suggest the sleeping giant is finally waking...

> "3D MOBILE GAMING WILL TAKE OFF IN 2005... THERE'S A TREMENDOUS SURGE OF INTEREST"

TALKING POINT | 3D mobile gaming
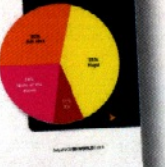
● You want conventional news? Go read a paper! You want analytical, thought-provoking reads that inform you about your industry? Read Pre-viz

---

your family while moving around the country, or even around the world.

"For some, the ups and downs of the business are nothing to fear. For others, having your children grow up in one place is more important. Maybe stability and health insurance are better than being able to say: 'I'm a professional animator.' If you really want to do this for a living, here are some things to keep in mind: firstly, it's a lot of long hours, and it's not always fun.

"Secondly, you'll always lose your job, so keep at least three months' salary in the bank. But thirdly, you'll always find another job – you just don't know when. If what you want is to animate: do it."

NO MORE NEWS?

> I've subscribed to *3D World* for a while and have found it extremely useful for keeping up to date with the industry. I loved the news section, and while I was job hunting, it was my main reason for buying the magazine. But since the new layout, I've found it impossible to read: instead, it seems to have been replaced with a load of Q&As! The news ain't up for discussion – it should be a matter of fact. Please bring back some content that keeps us abreast of the industry.

Joe Lygoe | Studio Manager, Picasso Pictures

● Mental Roy in the midst of sounding off. He may be a few polygons short of a mesh, but let's face it, you know he's right. Would you argue with him?

It has certainly never been our intention to dispense with conventional news stories.

However, we feel that as the number of websites reposting product announcements and studio press releases increases, it's more important for us to provide content that would be difficult for readers to obtain online.

And parts of the Pre-viz section are clearly finding an audience, as the next letter indicates...

ROY OF LIGHT

> Although I swore that I would never read Mental Roy again after his cracks about Miss Digital World [Pre-viz, issue 62], I am surprised to find that I steer unswervingly towards his column every month. And in issue 65, I have to agree with him. As someone who remembers the good *Doctor Who* the first time around, I feel an opportunity has been lost. I am sure that all sorts of clever 3D work has been done on the series but, to tell the truth, I felt

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rather disappointed. Now, this could simply be because I have grown up, but if Mental Roy's theory (that the new series is aimed at Dads who saw it the first time round) is to be believed, then it isn't working.

(Since reading his article, I have quietly hung up my jeans and leather jacket, and can be seen nonchalantly walking around in something a little trendier, by the way.)

But there's one question I just can't get out of my head. How did Mental Roy know that a 'Buzz Bunny' was a brand of clitoral stimulator? Should the column really be renamed 'Mental Royetta'?

Steve Challice | Via email

Wouldn't that be 'Mental Rae'? Or possibly 'Mental Rosie'? But no, Roy's knowledge of feminine joy products is entirely down to the power of Google. That's what he tells us, anyway, and quite frankly we didn't care to enquire any further. He's an excitable chap at the best of times, and we didn't fancy setting him off...

Send us your exhibition images | 3dw.exhibition@futurenet.co.uk

FARKAS 'EKHO' ZSOLT Little Beast
LightWave, Photoshop

"With this image I wanted to challenge myself and make a very complex 'skin' for the iguana. The texture map is completely hand-painted, using a graphics tablet. There are two main maps: the head, neck and forelegs; and the body, tail and legs The body is completely filled with bones, which makes animating fairly easy. Unfortunately I'm working on our new game, so right now I don't have much time for that."
[e] ekho@vipmail.hu
[w] ekho.tx.hu

NICOLAS RICHELET City's Heart
3ds Max 7, V-Ray, Photoshop CS

"This image was made for a contest on www.cgarchitect.com. I'm inspired mainly by 2D artists like Ryan Church and Feng Zhu and I hope I can do the same things with 2D tools one day."
[e] nrichelet@infographiestudio.com
[w] www.infographiestudio.com

EUN HEE CHOI Etaine
3ds Max, Photoshop, V-Ray

"Having worked in an animation studio as a modeler for three years, I now do freelance work producing 3D illustrations and characters. This image depicts Etaine, the goddess of a Korean online game called *Shaiya*. I have enjoyed books full of illustrations since I was a child and have been influenced by Greek Mythology and the works of Adolphe-William Bouguereau."
[e] hi97bzo@hotmail.com
[w] www.kjun.org

NICK FRANKLIN Stills from The Lepidopterist
Cinema 4D

"I started writing my short animation, *The Lepidopterist*, in 2001, when I was 16, and continued to work on it steadily in my spare time. I took a break from the project in June 2003 when I began studying animation at the Art Institute of California in San Francisco, but have finished it since I've been back. My friend, Allie, composed the music – which adds a lot of life and helps make up for my less-than-perfect animation."
[e] butterflyfilm@gmail.com
[w] www.thebutterflyfilm.co.uk

LEE STADLER (Clockwise from top left) Palindrome,
The Awakening, The Clockroom, Yesterday
Bryce, Photoshop

"I've been working as a digital artist for about three years. When working on a piece, I try to get to grips with the subject matter as much as possible. Whether it's modelling, post or any other aspect, each element plays a big part in the final image, so I make a few freehand sketches before jumping in to the design too deeply. Much of my work focuses on colour and light – and often, the lack thereof. These are the two points of a piece which tend to draw my attention because of the emotion they evoke. More than the meshes, terrains and perspective of a work, light and colour complete a particular piece and make it look just as was intended."

[e] lee@opus-finearts.com
[w] www.opus-finearts.com
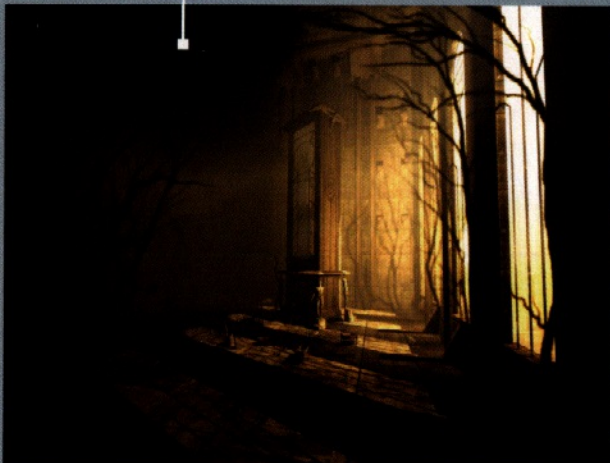
Care in the community?

TRADE BODY With CGNetworks launching its own worldwide CG organisation, why doesn't the UK or EU have an equivalent of SIGGRAPH – and does it necessarily need one, anyway?

CGSociety is the latest effort to unite creative CG artists from around the world. Formed as an offshoot of CGNetworks, it's partly the brainchild of Leonard Teo, former Chairman of the 3D Festival and Managing Director of publishers Ballistic Media.

It is, he says, "the next logical step to evolve the ad hoc community into a formalised organisation. It became apparent that we were the leading organisation that was doing this through our CGNetworks and CGTalk communities, and through our books such as the *EXPOSÉ* annual."

CGSociety's manifesto states that it's committed to "enhancing the global state of creative digital arts." This includes news, forums, workshops, online portfolios, a forthcoming magazine, and CGConference, which is in the planning stages.

Cynics might say, however, that this is simply a way of publicising CGNetworks and its products. "The surprising thing is that nobody has brought this up... until you," Teo replies. "Our main objection to the CGSociety was from CGTalk community members who expect everything to be free (and I mean absolutely everything), to the point of ridicule where people begin wonder if some of these members were simply 'freeloaders'.

"The cynicism and objections completely died down after these people soon realised that nothing had really changed. Nothing was being taken away from them — in fact, they were getting more from us than ever before."

CGSociety is very much a global organisation, but is there a need for a professional body specifically for the UK and Europe? Since the demise of the 3D Festival and LEAF, there has been no single umbrella organisation or 'must attend' meeting point for the CG community in Europe – unlike, say, SIGGRAPH in the US.

Previous attempts to set up a dedicated, professional UK CG organisation failed for various reasons. In 2002 the organiser of the 3D Festival, Jimmy Hassell, arranged a meeting for around 300 CG experts at BAFTA.

Mike Milne, Head of Animation at Framestore CFC, was heavily involved with this potential show, as he explains. "The overwhelming feeling we got from everyone we talked to was that the society should be formed by people working in the industry, rather than by our hardware or software suppliers or professional conference organisers looking for an additional source of revenue."

After more discussion and securing potential funding name a name was settled on: IDEA (Institute for Digital Effects and Animation), financed by annual member subscription. But Milne, rightly or wrongly, believes that he "dropped the ball," due to his various work and personal commitments.

"Basically I was stretched too far, and something had to give - I simply didn't have the time to spare to keep up the organisation of it," he says. "Around that time Jimmy Hassell, who had kept me under pressure to keep IDEA afloat, decided to quit the 3D Festival and the CG world altogether." Thus IDEA never became more than an idea.

Milne is still interested in the formation of something similar, up to a point. "The aims and powers a CG organisation should have are to provide a means of networking within the industry, to promote the industry at home and abroad, and lobby organisations such as the government (national and EU)," he says. "It should be a one-stop

> ## "THE DIFFICULTY WITH THESE BODIES IS THERE ARE SO MANY INTEREST GROUPS INVOLVED"
> **SHELLEY PAGE, DREAMWORKS EUROPE**

Would a UK or EU umbrella organisation have the CG community queueing round the block - or is there more value in diversity and specialised local groups?

TALKING POINT | Building society

"The key differentiator between CGSociety and other trade organisations in the CG industry is that the CGS focuses on the creative aspect of digital art. Although we recognise the importance of technical and scientific advancements in our craft, it is imperative to note that these are only secondary to the expressionism."

Leonard Teo, Executive Director, CGSociety

"I think that a UK CG organisation would be desirable, and quite useful - but whether it's as strong as a 'need', I'm not sure. I believe the main impact of any such body is in the events that it arranges (such as lectures and seminars) and the awards that it gives."

Mike Milne, Head of Animation, Framestore CFC

"Because of SIGGRAPH, in the US everyone knows there's one event every year that will be cutting edge, show the newest material and give a chance to meet everybody in one place. I still think there's an argument for that [in the UK], but I have no ideas how that would come about without significant support from an outside institution."

Shelley Page, DreamWorks Europe

accreditation body for industry-related education courses, hold an Annual Conference and Award ceremony, and negotiate for credits with broadcasters and film production companies."

Shelley Page of DreamWorks Europe, who has a special interest in festivals and schools, was also part of the IDEA plan and is now on the board of CGSociety. "I was asked to join because I was involved with the 3D Festival," she told us. "I have to say, the lack of industry involvement in the location of that festival [Copenhagen] was, to me, a disadvantage. It was very much run by outsiders pretty much for outsiders, and I feel the only value really is one run for people in the industry, and ideally by them too."

While obviously enthusiastic about the CGSociety's aims, she still believes there's a gap for a UK event. "The difficulty with these industry bodies is that there are so many interest groups involved, there's a tendency to end up with the lowest common denominator

approach - 'Let's have Pixar talking about their latest movie' and that sort of thing.

"If you go to SIGGRAPH, I think on the whole you know you're going to get something out of it. I would be interested to hear if people going to European events in recent years felt the same."

The future of the industry, she believes, lies in specialisation: the idea of groups of individuals coming together to discuss topics of interest to that sector. "Things like masterclasses which could be set up on demand, which was one of the plans behind IDEA. I'm not really interested in a body run by an organisation that only wants to create an event in order to sell tickets."

But as she points out, organising and running such a body for already busy CG professionals is no mean feat. It may be a while yet before we see the EU equivalent of SIGGRAPH. ●

www.cgsociety.org

14% Now is the time
21% Never
28% Not for ages
35% Not quite yet

Firing the next-gen starting gun

SHOW REPORT The real stars of last month's E3 2005 show were not the speakers themselves, but the newly announced Xbox 360 and PlayStation 3 consoles. Early demos were stunning, but on current evidence, it will take imagination and hard work to make this next-generation technology sing

After Sony and Microsoft's next-gen press conferences, E3 became a battle of the teraflops. Microsoft's strangely-named Xbox 360 boasts three double-threaded G5 processors and a high-end ATI graphics chip. Rated at one teraflop of processing power, it's due for a simultaneous Christmas release across Japan, the US and Europe. Meanwhile, Sony reckons its two teraflop-rated PlayStation 3, with an eight-way Cell processor and Nvidia RSX graphics chip, should be available sometime during the first half of 2006. But while arguments raged over whether either platform was actually complete yet (they weren't) or if Sony's game demos were in real-time (debatable), there was plenty elsewhere to see.

Japanese developers, in particular, seemed keen to show the power of originality. Standout games included Clover's PlayStation 2 game, *Okami*, which meshed a 2D art style based on the washes of traditional Japanese watercolours with the story of a god incarnated in wolf form. Players also control a calligraphy brush to fill in the game world.

Another game making an appearance was *Shadow of the Colossus*, also for PS2. Created by the Sony Japan team behind the legendary *ICO*, *Shadow* features monsters so big that the in-game camera can only take in a small proportion of their bulk – a refreshing idea for an industry too often locked into cliched racing, shooting and beat-em-up genres.

But with Microsoft very much on the charge, it was playable Xbox 360 software that got most thumbs

twitching. One of the more impressive titles on show was Monolith's gritty first-person thriller *Condemned*. According to Lead Artist Matt Allen, the main focus of the game was to include as much atmospheric lighting as possible, including dynamic spots, soft shadowing and high definition textures. The game itself mixes forensic detection techniques with in-your-face melee combat, using pipes, pistols and any other object you can lay your hands on.

Nevertheless, creating cutting-edge content without decent tools is difficult, and Alias' games manager Geoff Foulds reckons gamers will have to wait to see the full power of the future consoles. "While the launch titles will be good, it will be the second and third-generation games that will be really impressive," he says. With Alias signed up to both Microsoft and Sony's middleware programme, he points

● It's the game industry's equivalent of SIGGRAPH and this year's E3 was particularly significant, with the introduction of new consoles from both Microsoft and Sony

"THE NEXT-GEN CONSOLES HAVE HUGE POTENTIAL, BUT THEY'RE GOING TO TAKE TIME"
GEOFF FOULDS, ALIAS

out that it's only after tools companies are able to optimise their packages that developers can make the most of the new technology. "It's definitely going to be a step up," he says. "The next-gen consoles have huge potential, but it's going to take some time before developers get to grips with them." The future isn't here quite yet.
www.xbox360.com
www.playstation.com

● Sony's *Shadow of the Colossus* is remarkable for its enormous monster opponents, and demonstrates the aesthetic power of not being able to see everything at once

New box, old assets | How to demo the cutting edge?

When your hardware isn't yet finished, it can be difficult to show off its capabilities

One of Sony's best PlayStation 3 demos saw the assets of London-based game *The Getaway* repurposed and polished to display the graphical power of the new console. Described by Sony Vice President Phil Harrison as a virtual tourist's take on Piccadilly Circus, it included the modelling of a camcorder's auto focus as well as saturated lighting effects and depth of field. A similar example saw Sony Picture's CG footage of *Spider-Man 2* villain Alfred Molina running in real time on the platform. This used high dynamic range lighting

together with sub-surface scattering to model the interaction of light with human skin. Slightly more puzzling, however, was the allegedly in-game footage from titles such as *Killzone*,

Formula 1 and *Motorstorm*, which looked anything but. Some industry insiders even claimed to be able to pick out which US and UK post-production houses had been involved...

● Using the assets of PlayStation 2 game *The Getaway*, this is an example of what a PlayStation 3 version of the game might look like

● As the graphic realism increases, so does the unsettling effect of horror games. Monolith's first person shooter *Condemned* could usher in new standards of gore

How long do you think it takes to get this good? Think again.
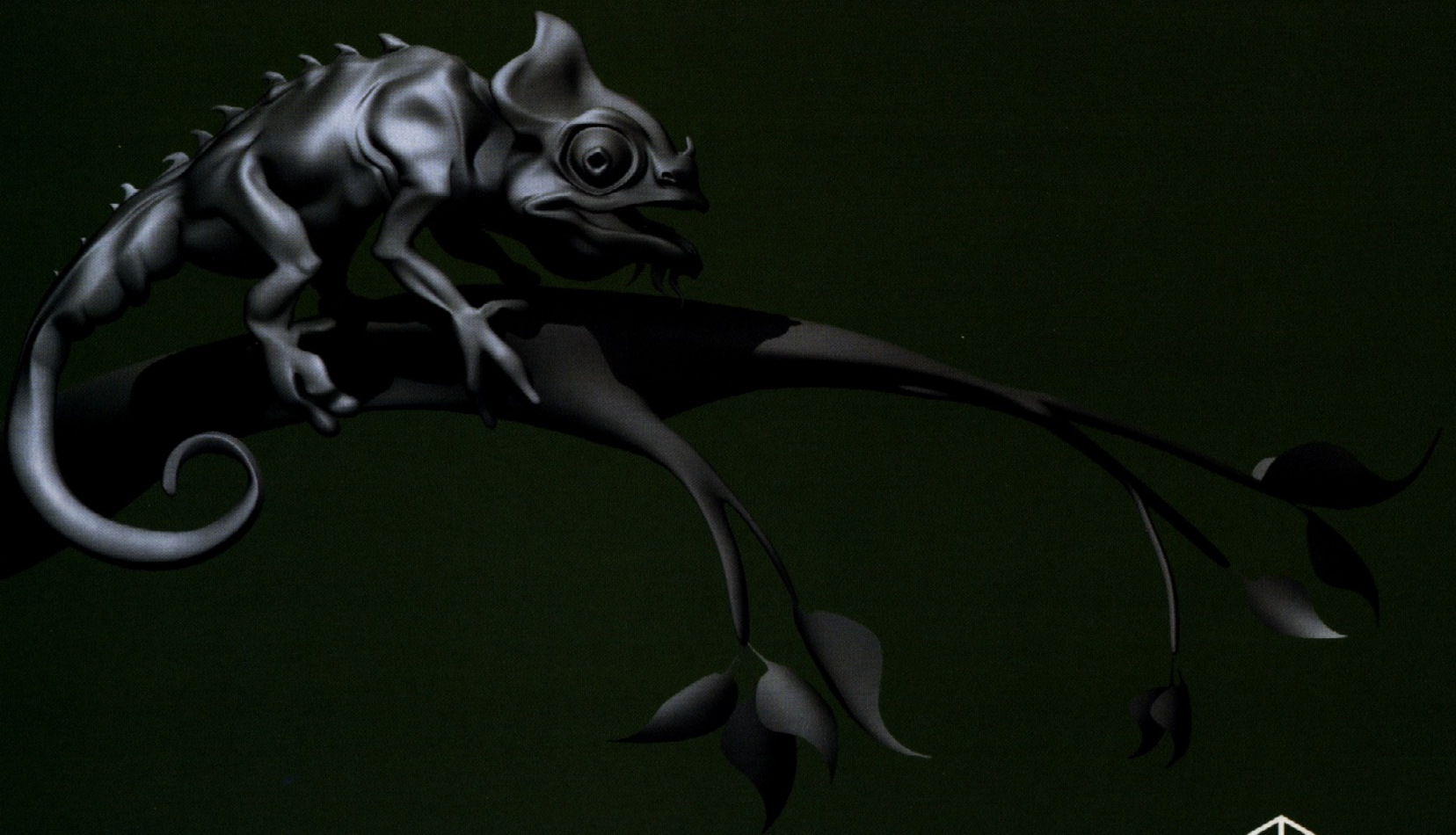
WHY ONLINE LEARNING? There are a few reasons why I believe in this type of education, at least for animation, anyway.

First, an online school can give students from all over the world access to the best instructors in the field with less time, money, and hassle it would take to attend a traditional school. I come from Spain. Here, learning from artists actively working in the industry is more than rare! It's truly instructional to learn from people who have day-to-day experience of the big animation studios. So, when I decided to learn animation, I moved to the US.

Today, though, with immigration and visas a big obstacle, people have more restrictions in their ability to learn from the best unless they travel long distances, and spend a lot of money on tuition, accommodation, and so on. An online school bypasses all of these obstacles.

Second, through current technologies, an online school can be set up so that students are given personal attention and learn on multiple levels. When I attended a traditional school, I felt like I always had to wait for my turn to learn something because there was only one instructor for the entire class. We set AnimationMentor up so everyone gets full attention from their instructor - we like to say you get 100% of the class plus 100% of the critique time...

In the critiques, the teacher actually goes through the student's exercises, and draws on top of them (or even animates in front of them) for an increased learning experience. Now, because these critiques get recorded, every single student on campus can access them and learn even more.

So essentially, now you can learn from the rest of the students and many other teachers all at once through multiple video critiques and revisions, through globally broadcast live video conferences, and through the constant interaction between students and their peers, without being restricted by either geographical distance or something as simple as school hours.

Finally, an online community allows students and instructors to help everyone reach their potential through peer feedback and support. Because an online school is active 24 hours a day, seven days a week, students can interact with each other throughout the world at all hours. They can even get peer feedback and support on their assignments within the hour. This type of global support is typically not available in a traditional school environment.

So this is why with online learning, everyone is learning, and more importantly, they're doing it fast. This seems to be the most powerful aspect of the whole approach, and I certainly envision education in general moving more and more towards this style of teaching in the future.

ACCESS TO THE BEST INSTRUCTORS FOR LESS MONEY AND HASSLE
CARLOS BAENA, ANIMATIONMENTOR

Carlos Baena is a mentor at AnimationMentor, and has worked on the likes of *The Incredibles* and *Finding Nemo*. He's currently working on Pixar's *Cars*.
www.animationmentor.com

+ POLAR OPPOSITES -
Which is more effective: online training or traditional classroom-based courses? **Carlos Baena** of AnimationMentor and **James Huggins** of Escape Studios duke it out

James Huggins is Marketing Director of Escape Studios, a London-based training facility specialising in 3D animation and 2D visual effects.
www.escapestudios.co.uk

AT ESCAPE, WE SPEND time and energy monitoring technology. There are always new versions of software, changing pipeline trends, new techniques and developments in how people can be taught - and while stories of 'virtual classrooms' are intriguing, there is no substitute for a professional standing right next to you, giving you immediate feedback.

So what are the pros of classroom teaching? I asked a few of our 'Escapees' why they had opted to train with us instead of going online. The first reason was speed. Sometimes it's difficult for a student to articulate a problem and the use of visual cues, either through examples or sketching something, are the only way. Conversely, the Internet sometimes has an interesting notion of speed and has made us all get to know the word 'lag'.

Another reason was the element of social interaction. Our classes are capped at ten students, which means being immersed in a small team. Inspiration, ideas and progress are often derived from the people sitting next to you as well as those standing at the front. And this social dynamic has implications that go beyond the classroom.

Escape enjoys fantastic relationships with a huge range of companies who are often invited to the studios to impart advice.

In addition, classes are always taken to company premises in order to meet the teams and get a better understanding of a working professional environment. One of our *Maya* classes was at the Moving Picture Company and returned full of renewed enthusiasm and vigour.

Another key difference is the idea that, with classroom training, you actually have to go somewhere. The power of this shouldn't be underestimated. I'm sure there are a few people out there who've experienced first hand the motivation and discipline issues involved in working from home (or trying to, at least).

More importantly, Escape courses are not just about using software. Having a physical location allows us to demonstrate the importance of working in groups, punctuality and personality. Escape isn't an academic institution; our goal is to establish a structured community that facilitates creative interaction. In terms of our physical space and philosophy we're more like a production outfit.

Technology will continue to improve the learning experience and make knowledge more accessible. In most cases it makes a nice accompaniment to, rather than replacement for, classroom-style teaching. However, true communication is a vastly rich and complex process incorporating environment, gesture, articulation and shared experience. Who knows, the future may give us a better alternative... but we're not there yet.

THE INTERNET HAS MADE US ALL GET TO KNOW THE WORD 'LAG'
JAMES HUGGINS, ESCAPE STUDIOS

WEBSITE OF THE MONTH

www.x-bam.com

THIS ONSITE HOME of "an experienced group of CG artists and illustrators" is currently host to an astonishing pastiche of the recent Citroen C4 ad. Yes, the one with the dancing car, created by The Embassy. Artist Alex Mallinson's version features a rather less swish Citroen 2CV strutting its stuff, with unfortunate end results and a tagline that only appears on some versions.

Mallinson created his spoof in around two weeks while working on other projects, and though he says "the animation is by no means perfect," it's still a fine testament to his skills. According to the site, the animation had been downloaded 240,000 times in six days. Someone hire these folks to do a viral campaign

– and check out the animation before Citroen's lawyers see it. ●

Further sites...

www.medialaundry.com
The Medialaundry is a new service designed for sharing and receiving files across the Net, using an app designed by the makers of *Pro Tools*. Claims to be fast, easy and secure, with prices from €10 per GB.

spore.ea.com
Official website for *Spore*, the intriguing new 'Sim Everything' game from original *Sims* creator Will Wright, still in development. Featuring generative graphics based on natural selection and mutation, no less.

SINGAPORE SWINGS

FRANCHISING 3D animation next on its list

IF THE MEDIA Development Authority of Singapore has its way, that country could soon be an animation powerhouse to rival the States and Japan. The MDA is currently part-funding production of *Zodiac, the Race Begins,* the first 3D animated feature produced fully in Singapore. Rather more oddly, it's also being touted as the first film of any kind with the Chinese Zodiac as its content. About time too.

Adding to the strangeness is the fact that *Zodiac* is being developed by Cubix International Pte Ltd, a local brand and communications consultancy – perhaps not the obvious choice, all things considered. But then The Singapore Mint is also on board, poised to create Zodiac-themed gifts and collectibles.

With all this important marketing and brand-focusing going on, the plot of the film itself seems somewhat irrelevant, but for what

it's worth it charts the adventures of 12 animals in the race to become celestial Kings of the Zodiac. Cubix is already looking for partners to distribute a potential TV series, despite the fact the film won't be completed until early next year. Get your bids in now.
www.mda.gov.sg
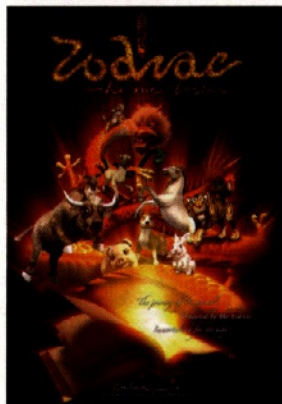
● The Chinese Zodiac finally gets the recognition it so sorely deserves

EVENT HORIZON

THE SHOW: TWO
24 JUNE – 3 JULY, LONDON, UK
Animation graduates from The Royal College of Art will be screening their work in this second part of the annual summer show. A great chance to check out new talent.
www.rca.ac.uk/pages/showcase/the_show__2521.html

OPTRONICA
20-24 JULY, LONDON, UK
A joint production between the bfi National Film Theatre and Addictive TV, Optronica is a hybrid film and music festival and celebrates the convergence of both. Featuring the likes of Plaid & Bob Jaroc and Addictive itself.
www.optronica.org

RUSHES SOHO SHORTS
30 JULY-5 AUG, LONDON, UK
Rushes' seventh annual festival goes regional. As well as the usual Leicester Square showings in London, there will be screenings in Shepherds Bush, Birmingham, Edinburgh, Cambridge and Islington.
www.sohoshorts.com

SIGGRAPH 2005
31 JULY-4 AUG, L.A, USA
A little show you may have heard of. The 32nd festival is being graced with George Lucas giving the keynote address, as well as the usual bewildering avalanche of new products, talks and parties.
www.siggraph.org/s2005

Bryce bounces back

SOFTWARE A mere four years later, the ground-breaking package gets a point update. But is there a future for this aging veteran, and can it keep up with the programs it inspired?
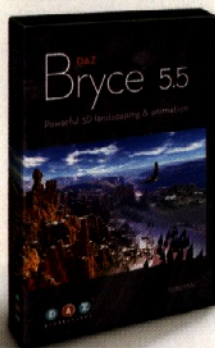
Eovia has finally released a new version of veteran landscaping program *Bryce*. Version 5.5 is the first major update of the seminal app since 2001, and has been developed by DAZ, following the program's acquisition from Corel last year. Having said that, this release doesn't boast a huge number of new features. Top of the list is increased rendering speed – 30 per cent faster on average, according to Eovia. The OpenGL display mode has also been revamped, now featuring low-res versions of materials as well as the usual shaded objects. There are a number of new OpenGL modes such as Wireframe, Lit Wireframe and Smooth Shaded to suit the particular scene being created.

Bryce now integrates closely with *DAZ|Studio*, Eovia's *Poser*-like streamlined app, despite the fact that it's still not yet out of beta. The *DAZ|Studio* interface can be launched directly within *Bryce*, and edits made to objects are automatically updated once the app is closed. This should make the placement of figures, wildlife and other props much smoother within *Bryce*.

The network renderer, Lightning, has been rewritten to improve stability and be less obtrusive. It can also now render over a LAN or WAN. Finally, the Terrain Editor has been tweaked to display more detail, while sculpting tools

are said to be more accurate and intuitive, with several improved methods of modelling.

Despite its age and chequered history, *Bryce* looks set to stay for a while yet. "Version 5.5 was quickly completed in less than a year in order to help show how committed DAZ is to continuing the development of *Bryce*," says Moriah Jones, Marketing Assistant at DAZ.

And version 6 is definitely in the pipeline, though she's coy about revealing further details. "[It] will be designed to incorporate many modern features that take advantage of the latest strategies in 3D technology," she says. "Such improvements will strive to make *Bryce* the most popular choice for the creation of digital scenery." Whether that means a total rewrite or a fresh approach, only time will tell.

Bryce 5.5 boxed costs £83.66/$109.95/€119.54, or as a digital download at £75.29/$99.95/€107.58.
www.eovia.com, www.daz3d.com

● Integration with *DAZ|Studio* and faster rendering speeds are the major new features in *Bryce 5.5*, the first version in four years

Production line
The month's other releases in brief

TURBOCAD PROFESSIONAL 11
Latest version of the long-established CAD program, featuring 2D drafting combined with 3D modelling and rendering. New features include an 'intelligent' interface which adapts to your working mode. £549.99 to you, squire.
www.turbocad.co.uk

DOSCH 3D: CARS 2005
A collection of 15 detailed and textured car models, including the Audi A6, BMW X3, VW Golf and Peugeot 307. All are available in the usual file formats, but you'll have to get image copyright permission yourself. $119/€99.
www.doschdesign.com

EASYNAT 2.5
Bionatics' plant-modelling app notches up a new version for use with *Autodesk VIZ 2006* and *Architectural Desktop 2006*. It claims faster and easier modelling, plus tighter integration with the host program's core and backwards compatibility. $39/€30.
www.bionatics.com

FLIGHT STUDIO 1.5
A plug-in for working with OpenFlight databases within *3ds Max*. Load, edit and export scene graphs, with attribute editing and LOD management plus complete access to *Max's* existing tools. SRP $1,495, with existing users able to upgrade for free.
www.turbosquid.com/dcpstore

MAKE YOUR GRAPHICS FLY

FireGL V5100
£429 MRSP + VAT

THIS ISSUE'S WINNER
3D WORLD
THE ONLY MAGAZINE FOR 3D ARTISTS

Autodesk
Media and Entertainment

Make your graphics fly! Don't let your creative talent be delayed by waiting for your scenes to update. 3D creation and compositing is time consuming business, you can't afford to be waiting around or have a crash! ATI FireGL™ cards use optimised drivers to give performance and more importantly reliability in your applications whether it be **Autodesks™ 3dsmax™, Alias™ Maya™, Softimage® XSI®** or any other top 3D creation tool.

You might think this would be expensive but with cards starting at £250 and the award-winning top of the-range **ATI FireGL™ V7100** costing only £599 MSRP, there's no need to wait, start creating today.

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Projects round-up

This issue: a mini Live Aid, vivid hallucinations and Jeremy Clarkson

01 MAKE POVERTY HISTORY FILM

It's 20 years since Live Aid, and Bob Geldof wanted a way to raise awareness and lobby the government prior to the G8 Summit - hence this 90-second film, produced by minivegas. "We captured the deterioration of a malnourished child in a 30-second shot using a motion control camera, prosthetics and CGI animation," explains Director Luc Schurgers. "With a motion control rig, we shot numerous film passes, changing the prosthetics and make-up to represent the stages. After compositing in *flame*, *Softimage|XSI* was used to enhance the overall effect."
www.minivegas.co.uk, www.makepovertyhistory.com

02 THE JACKET

This gothic thriller - in cinemas now - tells the tale of Jack Starks, who is locked in a morgue drawer until his mind fragments. "Jack's eye is the entry point to his inner world, so we created a photo-real CG iris," says Frazer Churchill, VFX Supervisor at Double Negative. "The camera pushes into actor Adrien Brody's tortured face, then the CG iris until it fills the frame and dilates, as images from his mind appear. For these we took a montage of disturbing footage and integrated them onto the iris. We used *Maya*, *Shake*, and Double Negative's own software, *DNV*."
www.dneg.com

03 HEARTSTOPPER PROMO

Emiliana Torrini's credits include two albums and performing 'Gollum's Song' in *LOTR: The Two Towers*. For her latest video, Passion Pictures created a seaside-style puppet show. "We built and filmed the puppets and sets," says Producer Russell McLean, "and Director David Lea spent a week compositing and grading in *After Effects*. His main challenge was to combine 16mm footage of Emiliana with DigiBeta puppet footage. It was edited with *Premiere*. The footage was extensively graded, and effects such as sparks and smoke added to enhance the atmosphere."
www.passion-pictures.com

04 SPORTLIFE 'DEEP' COMMERCIAL

PostPanic produced this ad for Dutch chewing gum brand, Sportlife, using *3ds Max*, *Brazil*, *After Effects*, *Illustrator*, *Photoshop* and *Final Cut Pro*. Director Mischa Rozema explains: "We wanted a face that couldn't be placed, so we combined two models (Scandinavian and Japanese), focusing on the hardness in their faces, while making the eyes widely spaced and strange." 3D Lead Ivor Goldberg adds: "The biggest challenge was getting the skin to look as human as possible, especially the translucence. Sub-surface scattering really made a difference."
www.postpanic.com

05 TOP GEAR TRAILER

To launch the new series of the popular BBC motoring show *Top Gear*, Red fired tiny cars from a gun. Senior Producer James Lamb: "The shots were pre-visualised in *Maya*. Car models were purchased from a library, then modified. Simple, textured geometry of the actor's body and hands, the gun and environment were built to give realistic reflections and shadows. We also built a realistic CG hand surface. The shots were rendered in *mental ray* and *Maya*, and CG elements of the cars were combined in *Shake* with reflection, shadow and environment passes."
www.red.co.uk
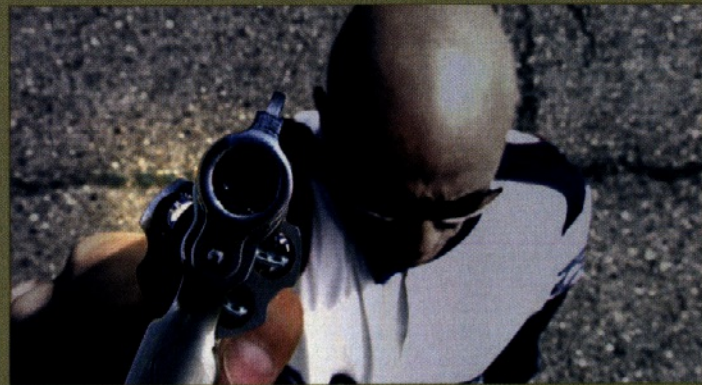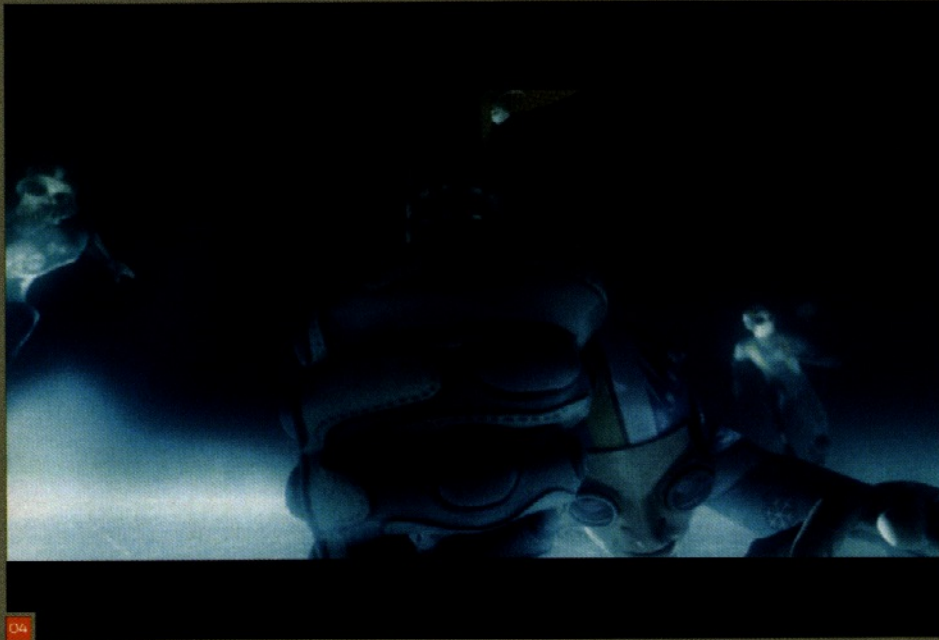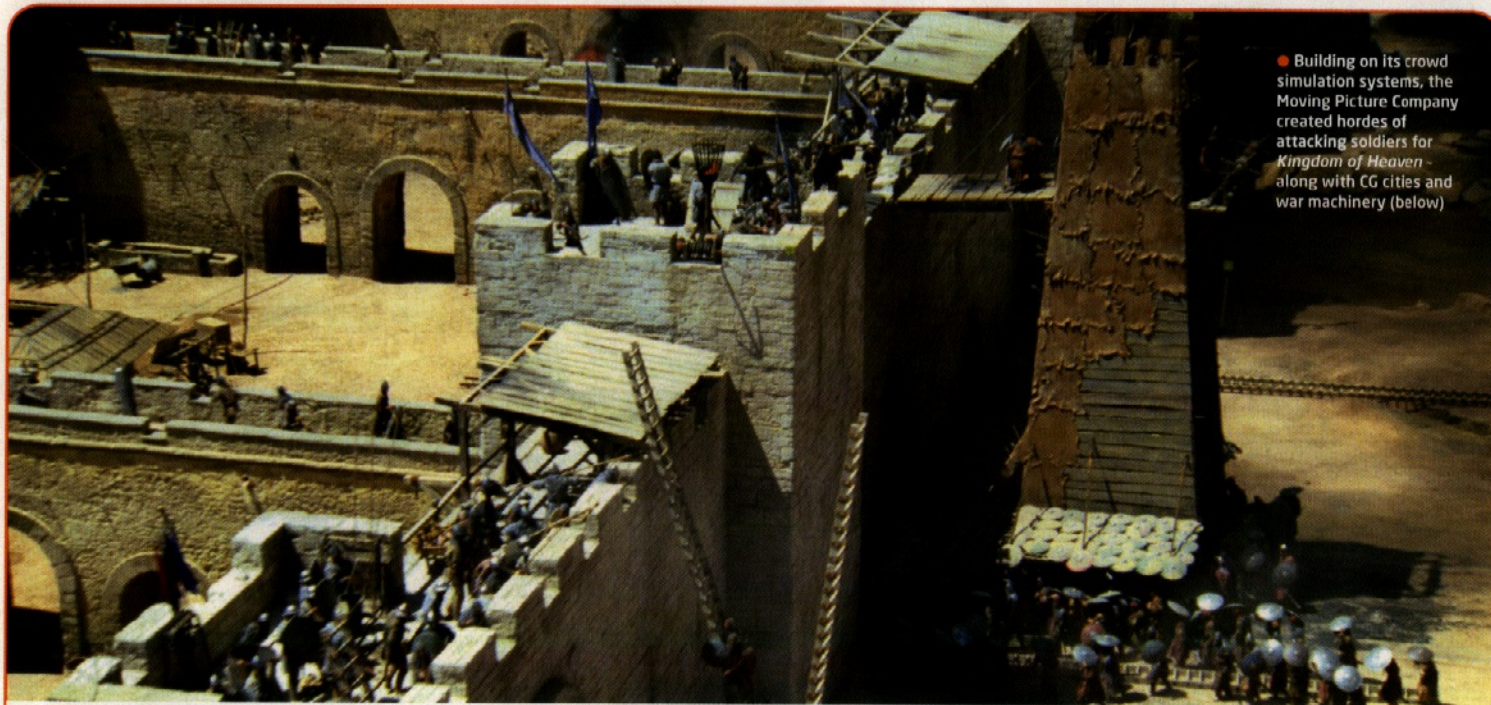
● Building on its crowd simulation systems, the Moving Picture Company created hordes of attacking soldiers for *Kingdom of Heaven* - along with CG cities and war machinery (below)

Kingdom of Heaven

FILM Ridley Scott teams up with the Moving Picture Company for more bloodletting on this mediaeval epic – but has even this most tech-friendly of directors had his fill of gratuitous CG?

You can't have failed to notice Ridley Scott's latest historical epic *Kingdom of Heaven,* a rip-roaring if not entirely accurate tale of the Crusades starring Orlando Bloom. More than half of the 800 effects shots in the film were completed by the Moving Picture Company, which once again drew upon its proprietary crowd simulation tools to create vast hordes of soldiers, à la last year's *Troy.*

This time, however, the task was complicated by the need to have CG infantry riding CG horses. Mocap sessions employed 24 cameras to capture horse and rider movements, with another for footsoldiers. This raw data was processed in MPC's proprietary Motion Library Editor (MLE) to create a portfolio of generic movements. Other sessions built libraries of actors interacting with props such as siege towers and catapults.

MPC's crowd-sim tool ALICE was once again expanded and updated to meet the requirements of mounted combat. Specifically, the AI of the 'horse' agent had to directly affect the AI of the 'rider' agent in realistic ways, which entailed some head-scratching R&D. Eventually an in-house physics API was incorporated with both MLE and ALICE to accommodate the quadruped agents.

In another change to established practices, MPC opted to create fully CG cities and set extensions rather than a mixture of miniatures and graphics. VFX Supervisor Tom Wood explained this was done for reasons of "flexibility, cost and realism.' Working with Scott, Wood and his team took numerous reference shots on location in Morocco and created whole vistas, cities and one-off views using another new proprietary system.

While Ridley Scott praised all the film's effects, and MPC's work in particular ("spookily real"), he's perhaps not as big a poster boy for CG work as expected. He told *VFXWorld* that the prevalence of live action and CG now becoming the norm in most action features is "very dangerous," particularly when it's conveniently dimly lit.

"It's very easy to get weird with eternal twilight," he added. "You just crush the shit out of it... The dangerous thing is when you have that high sun, full bore fog light, that's tricky."

But Tom Wood isn't fazed. "I'd say this is down to the general trend towards bluescreen shooting as a way to avoid the big set builds," he commented. "From the director's point of view, what you see through the camera is what you direct and what your movie looks like. CGI, while offering an unlimited cornucopia of options, is not there in front of you as a director, while you're making your movie."

[w] www.moving-picture.com
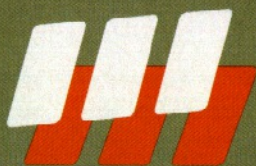
Since this is supposed to be a letter about Hollywood, I thought I'd list some reasons why it's good to work in the CGI industry over here, in no particular order. This isn't a sales pitch, so stay where you are - your local facilities need you.

1. CG Features

I like CG feature films, and I'm glad a lot of them are being made. Working on them creates a different set of demands from doing effects work. Plus the work you do is, for once, actually supposed to be noticed.

Ironically, Pixar and PDI are not actually in Hollywood, but DreamWorks and Disney are, and anyway, Hollywood is a state of mind as much as a physical location. So we can claim Pixar and PDI and Blue Sky, for good measure. Oh, and C.O.R.E. and DNA, while we're at it. The point is, you get a choice. If effects are your bag, great; if not, there's room for something else too.

2. Overtime

It's a funny thing, but here in the heart of merciless free-market capitalism, the big studios actually pay overtime for those long days and missed weekends. The details differ from shop to shop, but the fact that it is paid at all is a little amazing. You might think this indicates that robber baron capitalism is really soft

Hooray for Hollywood

Craig Zerouni of Side Effects Software comes over all starry-eyed as he reflects on the home of glitz, glamour and valet parking. And no, it's not Reading

and cuddly in the centre, but sadly that's not true. I asked someone high up in the food chain just exactly why the facilities volunteered (that's right - it was their idea) to pay overtime, and the answer was "We were all afraid we'd get sued." Which, in fact, is exactly what is happening at a certain games company not far from here. So take the money and be happy.

3. They actually make films here

It is a regular occurrence to see film trucks taking up a whole street, and lighting rigs cluttering up the sidewalk. And there is always a motorcycle cop sitting around, drinking coffee; in fact, I'm willing to bet it's always the same cop.

It's great - it's a constant reminder of what makes this place different from, say, San Diego. And yes, a lot of filming has gone off to Vancouver and Toronto, but until I see a large, iconic sign on a mountaintop that says "VANCOUVER", I'm not going to worry too much about it.

4. The weather

The weather is the reason the film business came here in the first place (fact - look it up), so you can't really separate the business aspect from the climate. And there may be lots of reasons to want to live someplace else, but when day after day is just too beautiful for words, it's hard to pack the car and get out. It's a wonder anyone gets anything done at all.

5. Parking

It's a breeze. What do pixels have to do with parking? Not much, but you want a good experience with either, this is the place.

Sunsilk 'Monsters' ad

Glassworks delivers yet another winning creature feature, this time creating a rogue's gallery of hair-messing meanies – because they're worth it, too... BY MARK RAMSHAW

Over the five years since a management buyout freed the studio from parent company Eidos, Glassworks has forged a unique reputation as an animation studio with R&D skills beyond its size. The latest such project offers a fresh twist on the traditionally vapid hair care ad. Glamorous female models do feature, but in this spot for Sunsilk shampoo it's a gang of mischievous monsters who provide the eye candy.

"It is a quite weird idea for a hair care commercial," says Glassworks Senior Producer Jonathan Davies. "We were quite shocked when the agency actually pushed us to make the monsters less cute and likeable."

There are three main creatures in the ad, each representing a different type of hair problem: Flatty, Breaky, and Greasy. Original designs for each were created by veteran artist Sang Jun Lee, whose other credits include character art for the *Star Wars* movies. While the agency proved keen to break free from hair ad cliché, Davies admits there was some trepidation about the use of digital character animation.

"There was some to-ing and froing between us, the director, and the agency in Paris. We were initially working with bald, untextured creatures, so it was tough for the agency to visualize what the finished version would look like. Even though we're famous for the Sprite ads and won an award for our work on the Aero mouse ad, it was quite tough to convince them that have faith in the whole process."

Prop master/puppeteer Jean-Pierre Grandet (of Honda Accord 'Cog' ad fame) provided the necessary hair manipulation on the live shoot in Brussels, while the Glassworks team deployed tracking markers on the models' heads, and gathered both standard and fish-eye lens shots for lighting reference. HDR maps were later augmented in *mental ray* with hand-placed lighting (including large area lights for soft shadows), plus dirtmap and diffusion shaders courtesy of Daniel Rind.

Modelling and animation was performed in *Softimage|XSI*. Glassworks' own hair styling system was further developed by Pete Reilly to offer deformation of any object along the length of the hairs. "The fur we created for the Aero kiosk ad still stands up, but I think our hair looks even better now," says Davies. "It was still quite a challenge to animate. We'd put together an animation, then apply the texturing and fur, and it wasn't until you'd done a render that you'd find that the slightest tweak had created a bald patch."

THE MARKS OF THE BEASTS

Each of the three creatures' scenes posed its own difficulties. Depth of field added in 3D upped render times significantly for those featuring the ad's first monster, Flatty. Frames were initially taking up to six hours to render out, though tweaking got this down to a more manageable three.

The second creature, Breaky, had to interact closely with the human hair. "We did push it around on set, but too much movement looks fake, so we also needed 3D hair," says Davies. "Breaky grabs hold of this and uses it to pull himself up."

Of the three creatures Breaky is the one more cute than monstrous. "There are a quite a few baby references in there, especially the way he does a sort of raspberry with his lips. And the eyes look lovely and glassy. They were originally even shinier and cuter than that, but we toned it down a touch."

The third creature, Greasy, was originally intended to sit on his hind legs with a piece of popcorn in one hand, but this was deemed too distracting. He also possessed a far larger tongue with which to lick across the unsuspecting woman's head, but once Greasy was placed on all fours he was also given a smaller, more manageable tongue, one with a dog-like animation. His hair was also made greasier and saliva-coated, to give it a more matted look.

Davies says the animators relished working on this particular ad. "Opportunities to do ads with this kind of work don't really come along very often. And though Glassworks already has a strong reputation for character animation, I do think the ad will push that just a little bit further."

Sunsilk 'Monsters' is currently being aired on major commercial TV channels in the UK and throughout Europe. It can also be viewed at www.glassworks.co.uk

DETAILS

TITLE
'Monsters'

PRODUCTION COMPANY
Independent

DIRECTOR
Rory Kelleher

RUNNING TIME
30 seconds

FIRST BROADCAST
April 2005

WEBSITE
www.glassworks.co.uk

TEAM SIZE
10

TIME TAKEN
3 months

SOFTWARE USED
Softimage|XSI, mental ray, boujou

FREEZE FRAME

A typically attractive woman stands waiting on the platform of an underground station, idly playing with hair that's noticeably lifeless. Getting a closer look we see a small blue creature with doleful eyes, droopy ears and six webbed feet has attached itself. The woman is oblivious its hair flattening antics. Next the camera pans overhead in a ladies' changing room. Cut to a close up of a blonde woman's hair, and a cute, round, porcupine-liked monster is tangled up in the strands, happily snapping hairs with its little paws. Next we see a young couple at the cinema, the girl's greasy hair shining in the darkness. The culprit is a small green monster, greedily licking at her scalp.

IN FOCUS | How Framestore CFC conjured up a trio of nightmarish hair monsters

01 The basic *XSI* poly model for the creature Flatty, with animation controls visible. Two rigs were used, simply as a result of two different people working on the rigging. "There are some big differences," says Alastair Hearsum, Glassworks' Head of 3D.

02 Lighting was created based on High Dynamic Range maps obtained using fish-eye images at multiple exposures and standard lens photos of the set. "In the case of Breaky and also Flatty we used a few large area lights."

03 The ad's second creature Breaky, viewed with base textures applied, but still no hair. "I largely used photos of my wife, kids and parents for various wrinkles and skin textures," explains Hearsum, rather tactlessly!

04 Glassworks' own in-house hair animation system was famously used to create a dancing mouse in an Aero ad. For this new ad, R&D programmer Pete Reilly wrote a plug-in to deform geometry instances down the XSI strands.

05 "I set up some semi-automatic fat-moving areas in the rig for Breaky, to allow for manual intervention," says Hearsum. However, "there was no need for real fat wobble" as movement was limited.

06 The guide hairs control some half-million fur strands on Beaky. Flatty possesses a similar number, while Greasy has around 85,000. The shots featuring Breaky also required human CG hair to be integrated into scene.

MeNTaL RoY

During a luxurious ten-minute break in his work schedule, resident columnist **Mental Roy** has come up with the perfect idea for a new blockbusting cash cow... er, delightful 3D animated epic. And for once, it doesn't involve cute animals
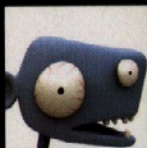
I'VE GOT THIS fantastic idea for a CG animated film. It's called *Mushland*, right, and centres around a group of crazy but loveable mushrooms. Mushrooms with legs and which can talk, obviously, because this is a magical world where anything can happen. Anyway, the mushies are all living quite happily until they discover that their forest is due to be razed to the ground by an evil multinational conglomerate, which - and we'll make this PERFECTLY CLEAR in the script - is in no way related to any major film company. That deals with the whole environmental thing and makes the money men seem like tree-hugging hippies instead of the disgusting soulless drones they actually are.

Chanterelle (played by Scarlett Johansson with a *hilarious* French accent) is the sweet and cute one, with whom our hero Portobello (Elijah Wood) is secretly in love, but is too much of a sensitive schmuck to admit it. Then there's the zany one, Shiitake, who turns out to have a heart of gold: Jim Carrey or, out of left field, Rowan Atkinson. Humans are pretty tricky to do, so we'll have an evil pig representing the baddies, called, I dunno, Saddleback or something. Don't bother me with details, I'm CREATING.

Obviously the mushrooms will have to defeat the bad guys in some way. I haven't quite worked that out yet, but it'll probably involve some sort of epic chase, and a bit where you think a character has died but actually hasn't. That'll have the little bastards sobbing in the aisles.

There'll be at least three 'fun guy' jokes in there, plus some gags about being kept in the dark and being fed shite for the adults to laugh at, and maybe a Robbie Williams number or two. Bosh it out in time for summer

EVERYONE KNOWS CG FILMS MUST ALWAYS BE AIMED ENTIRELY AT CHILDREN. WHY? JUST BECAUSE, OK

2006, get the merchandise rolling, do a sequel and several straight-to-video spin-offs. Pure bloody gold and a guaranteed revenue stream.

Hmm? The animation? Oh I dunno, we'll ship it off to China or something. Cheap, fast, easy and did I mention cheap? Let's face it, people will shovel up any old crap you throw at them these days - much like the mushrooms. (See, this script writes itself.) No need to spend a fortune on lighting or shader development or rigging systems or whatever is you technical bozos go on... and on... and on about.

You're right, it IS infantile and vapid. Oh, you meant that in a bad way? Ah I get it, you're one of these so-called artistes who thinks CG could be used in more imaginative ways. What is this, *Citizen friggin' Kane*? We're not making art here, we're making big bucks. Yeah yeah, you say people are getting bored of endless *Toy Story* rip-offs with recycled plots and characters, but what do you know? You're just a mouse jockey.

Besides, name me one animation franchise that appeals to adults. Okay, *The Simpsons*. *Family Guy*. I'll give you that. *American Dad*, yes. *I Am Not an Animal*, sure. *Monkey Dust*, *2DTV*... okay, okay, you can stop now. Because, um... no, hang on, I've got it: all those are traditional 2D-style animations.

Everyone knows that entirely CG films must ALWAYS and FOREVER be aimed entirely at children. Why? Because... well, just because, OK? I mean, you can't possibly think that all those Hollywood studio execs are talking out of their arses, surely.

So you get back to your challenging experiments or whatever the hell it is you do, and we'll see who's laughing when *Mushland 3* is pulling them in at the box office. Me, I'm sticking with the traditional ideals, just like Disney.

Oh, bugger.

GLOBAL ILLUMINATION #03

Key stats and trends from the 3D industry in specific countries. This issue: **South Korea**

Although it may not enjoy quite the same profile among western audiences as Japan or India, South Korea has been a key player in the global animation industry for more than 30 years. The country has mainly been an outsourcing destination for North American, European, and Japanese studios. This trend, however, is currently undergoing a change, with the industry increasingly producing local content such as *Turtle Hero*, *Bungabu* and *Milo's Great Adventure*.

Much of the Korean animation industry is located around Seoul. The animation studios in Seoul have developed a system of complex interrelationships: animation jobs are broken down into manageable pieces and then sub-contracted to different entities. This has resulted in the development of all-round capabilities and faster turnaround times. Recently, there has been an increase in partnerships and joint productions of animation content between Korean studios and broadcasting systems, educational institutions, game developers, toy companies and other third parties.

The leading studios in Korea are Sunwoo, Seoul Animation, Hahn Shin Corporation, Dongwoo Animation, Tooniverse, Saerom Animation, Daiwon C&A Holdings and AKOM Production Co.

This data was provided by Digital Vector, a research and consultancy firm providing reports on aspects of the global animation industry. Visit **www.digital-vector.com** for more info

- South Korea is the third largest producer of animation globally, after the US and Japan
- About 95% of South Korea's animation content is outsourced from overseas animation studios
- Korea is one of the largest suppliers of television animation in the world. Korean studios have the capability to produce over 1,200 episodes (22 minutes per episode) per year
- There are 450+ animation studios in Korea producing animation content
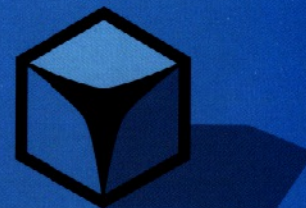
web links

High-speed internet connections now enable independent artists across the globe to join forces on major 3D projects: from game mods to feature films. But while online collaboration can allow near-novices to work on full-length movies, it creates its own unique logistical problems. So just how do you go about setting up your own collab team – and what can you realistically hope to achieve through it?

BY MARK RAMSHAW

Office environments are *so last century*. Now every city worker wants to wear their dressing gown all day, performing their job from home - with just a little help from a broadband internet line. In the non-CG world, a scattered and isolated workforce is rarely a good thing, but artists and animators have never been shy about using the internet for networking and are well used to toiling independently on the job in hand. It's little wonder, then, that so many are signing up to work on 'online collaborations' - CG projects produced by teams working remotely under one global roof.

Working remotely in this way quite literally opens up a whole world of possibilities. It's like outsourcing scaled down to an individual level, with all geographical and even some cultural barriers removed. And because the infrastructure of a traditional business becomes unnecessary, overheads come crashing down, enabling the scale of a project to go rocketing up.

As Bruce Fitter, the director of *The Dagger*, a feature film being created using a globally scattered team, points out: "Working remotely with collaborators spread around the world means the team effectively works right around the clock."

And because costs are low, online collaborations can be started with minimal effort and organised in a remarkably informal way. Such projects are often run as a sideline, with each

● The online collaboration revolution, drawing powers from across the globe for a common goal. Clockwise (from top) *Star Wars: Revelations*, *The Minas Tirith Project*, *shirowproject*, *The Dagger*, and *Aegis: 2375*

individual contributing as much time as they can spare, while fluid team structures mean people often leave or come onboard midway through development. There's no reason why any proficient artist can't become part of a global feature film production team. Whether the results give George Lucas a run for his money is another matter.

MODS, MODELS AND MOVIES

Over the last few years, three main types of online collaboration project have emerged. Teams dedicated to the creation of game mods (new levels, tweaks, or 'total conversions' for existing games like the *Quake* and *Half-Life* series) have been particularly successful. Then

> ## "MANY PROJECTS FAIL BECAUSE PROJECT LEADERS ARE OVERLY AMBITIOUS. START WITH A SMALL IDEA AND MANAGE THAT FIRST."
> KIRT STANKE, COLLABORATIVE TEAM PROJECTS FORUM LEADER, CGTALK.COM

there are modelling projects. These tend to be designed purely for fun, with the artists involved relishing the chance to work with like-minded people, often recreating props or environments from their favourite movies. Finally there are the short and long-form movie projects, some featuring a mix of live action and CG, others fully animated. These may be done just for kicks or conceived as a money-making venture.

"Commercially driven projects are usually one hundred per cent original, run by people with production experience, and attract attention from artists and audiences alike because people see

potential for exposure or financial gain," says Jason Hollefreund, a graphic designer and contract modeller who also works as project leader of new online collaborative movie, *The Gabriel Strain*. "They tend to attract artists working in the industry already who are looking for a fun sideline that has the potential to be financially rewarding."

By contrast, the team leaders of 'for fun' projects are generally less selective about who comes on board. "They'll generally take on members with little experience and take the time to mentor them," says Hollefreund. "Not being intended for anything other than to gain exposure and experience, these projects are usually more flexible."

NOTHING FOR MONEY

Projects run for fun aren't likely to have much in the way of an operating budget, which means that any artists and animators involved provide their services for free. Even commercially driven projects are unlikely to have the cash to pay team members much, if anything, up front. And if this project stalls or fails to makes a profit, there's no chance of a royalty payment. So what's the appeal?

"I've seen people of all skill levels involved in collaborative projects and you get different answers from each," says Kirt Stanke, Collaborative Team Projects Forum Leader at CGTalk.com. "College-level students may be interested in boosting their skills before entering the job market, for example."

Intermediate-level artists can also use online collaborations to hone their skills and obtain some positive exposure, which can be particularly useful if the project is a feature-length one. "It's usually incredibly difficult to get listed on a film's credits," points out Fitter.

CASE STUDY | The Dagger

Director Bruce Fitter discusses the importance of sponsorship in creating a successful online collaboration, through his experiences on *The Dagger*

Feature film project *The Dagger* grew out of a trailer created as part of director Bruce Fitter's Masters degree in Media Production. "The first thing I did was to talk to my head lecturer about how I was going to fund it," Fitter recalls. "He told me I'd need to talk everybody into helping out for free, so I began by posting requests for help on about three forums and received something like 160 applications in the first five days."

In the end, people from as far afield as Canada, Australia and Romania worked on the project. "I believe the trailer was the first live-action one to be created remotely," notes Fitter.

With the teaser complete, work has begun in earnest on the film itself. "I've just received a soft loan from the DTI [the UK government's Department of Trade and Industry], but everything up until now has been done for free."

Sponsorship in kind also plays a crucial role in the project, thanks in part to this very magazine. "It began when *3D World* put me

in touch with NXN Software, creators of the *Alienbrain* asset management system," says Fitter. "NXN CEO Gregor vom Scheidt offered to help, so I asked for 50 seats of *Alienbrain* and got them! We've been donated time at studios, loaned costumes worth £5,000, and had five different audio companies around the world offering to help."

Although much lower than the usual budget for a film of this type, expected completion costs of £1-2 million have encouraged Fitter to be creative in both staff recruitment and use of technology. "I've held meetings with a trade rep from the British Consulate General in Shanghai and Chongqing, with the aim of bringing in creatives from China, finding interested venture capitalists, and also getting permissions to film sequences over there," he says. "We're even talking with a company working on a 3D camera, which would allow us to use 3D keying rather than chromakey and shoot freely with a Sony HDV camera, which in turn would mean shooting with just five or so crew in different locations."
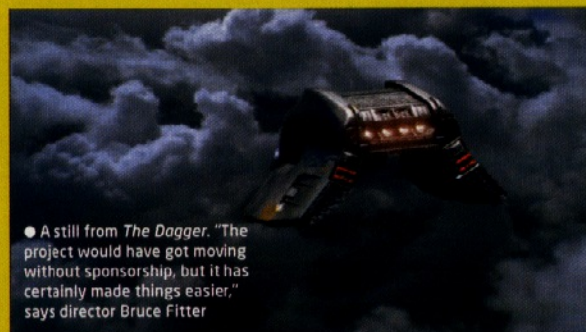
● A still from *The Dagger*. "The project would have got moving without sponsorship, but it has certainly made things easier," says director Bruce Fitter

FACTFILE

PROJECT
The Dagger

FORMAT
Live action / CG movie

TEAM SIZE
120 (on original trailer)

DURATION
TBA

CURRENT STATUS
Trailer complete, movie in preproduction

WEBSITE
www.rusted-image.co.uk /dagger
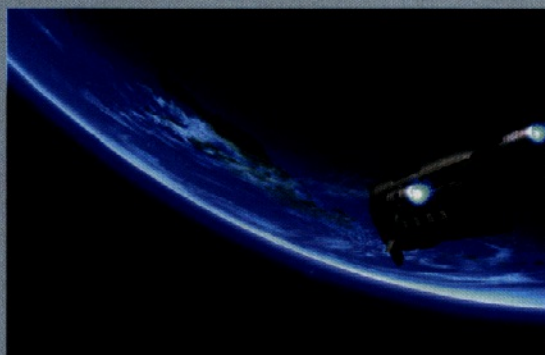
● An early peek at *The Gabriel Strain* (www.thegabrielstrain.com). "You never know who you're talking to," says team leader Jason Hollefreund. "It could be a grandma in Alaska, or the head of animation at Pixar."

Joining an online collaboration is surprisingly easy. Teams maintain an online presence in a variety of ways, including their own homepages and message boards, but for most, the first port of call is the collaboration forum on CGTalk. Here people post information about new projects and recruitment requests, provide progress reports, and use the boards as a management tool. "For projects that are successfully completed to a high quality there's also the potential for huge exposure through the general CGTalk site, [sister website] CGNetworks, and possibly Ballistic Publishing," adds Stanke.

Before contacting the leader/director of any new or existing online project, it makes sense to do a little preparation. Treat it almost like you would a job application, producing a mini CV to show interested parties what your background is, and getting your portfolio up to date so that they can see what you're capable of.

But how do you know if a project will be right for you? Look before you leap, cautions Victor Legerstee, team leader of sci-fi themed online collab *Aegis: 2375*. "Look through the story and concept art available and ask if it's something you can really see yourself working with for the next few months or years. And find out from the team leader how many hours they put in themselves. It's a good way to find out if they are serious about the project."

Of course, a serious team leader is likely to expect a similar level of devotion from the team itself. There's nothing to stop members from cutting back or dropping out if other commitments get in the way or they become disillusioned. But people who agree to take work on and then just quietly disappear do the community no good whatsoever.

DOING IT YOURSELF

If there isn't an existing project that appeals, or you'd prefer to be a team leader rather than a contributor, then maybe it's time to start up a new online collab. But be aware that getting one up and running and then guiding it to completion requires serious commitment.

The ability to manage both the team and a varying workload is a must. "In my own experience, the quality of the project depends entirely upon the project leader or director," says Stanke. "While people of differing skill levels might work on the project, proper management and strict quality control should mean the project never suffers."

What constitutes proper management of a remote team isn't really so different to that of a regular one, though the voluntary nature of the work means that a gentler approach is wise. "Something this complex takes a lot of planning so it's imperative that there is a hierarchy," says Daniel Hobbs, an online collab enthusiast who has recently started up his own project. "But then it's also important that each individual member of the team feels like their opinion is valued and respected."

CASE STUDY | Star Wars: Revelations

Not all online collaborations are done strictly for the love of the subject matter, as new fan film *Star Wars: Revelations* proves...

The *Revelations* project was kick-started by director Shane Felux, who posted in several 3D forums requesting volunteers for a *Star Wars* fan film with high production values. By this stage the script had been finalised and work had begun on scouting and planning live shoots, which helped demonstrate commitment to potential volunteers. Although the budget was zero at the outset, the intention being to pay only for cameras, software and costumes, Felux and his wife ultimately spent some £20,000 on the movie, using credit cards when cash was unavailable. The film was premiered at a cinema in Baltimore in April this year.

"More than 30 artists worked on *Revelations* over the course of three years," says CG designer Adam Benton. "Quite a few quickly disappeared, so the core team ended up eight-to-ten strong. The CG team worked for free, and it did cost all of us in terms of time. Some of us also upgraded our hardware and software sooner than intended to handle the massive workload."

As with many online collaborations, pre-production and pre-visualisation was more fluid than it would have been on a similar professional project. Storyboarding was limited: less intensive shots, like those for establishing a location, were often just verbally described, and once the location elements were created, almost final-quality animatics were offered for approval. "To his credit, Shane gave us a lot of creative license to generate the look, feel and motion of many shots, as long as it fulfilled his requirements in telling the story," says Benton. "I think this was a wise approach, as it not only helped to broaden the visual scope of the film, but kept us all motivated."

Generally, each artist was allocated a particular scene to work on in its entirety, so team members had to commit to the project without knowing the exact scale of the task.

The growing skill and ambition of the team members also played its part in increasing the workload. "As we individually achieved a goal, we often surpassed our collective expectations of what was possible, driving us all forward to make the next shots more realistic," explains Benton. "Often, when time allowed, we'd go back over some older shots, tweak them some more, and re-render them. This healthy competitive spirit helped us all individually to raise our standards, which only served the film better in the end."

FACTFILE

PROJECT
Star Wars: Revelations

FORMAT
Live action / CG movie

TEAM SIZE
30 approx

DURATION
40 minutes

CURRENT STATUS
Complete, available to download from website

WEBSITE
www.panicstruckpro.com/revelations

● *Star Wars: Revelations* is set between the events of *Episode III: Revenge Of The Sith* and *Episode IV: A New Hope*. As it wasn't created for profit, the makers have George Lucas's blessing to use familiar names, story elements and designs

FACTFILE

PROJECT
The Minas Tirith Project

FORMAT
3D model

TEAM SIZE
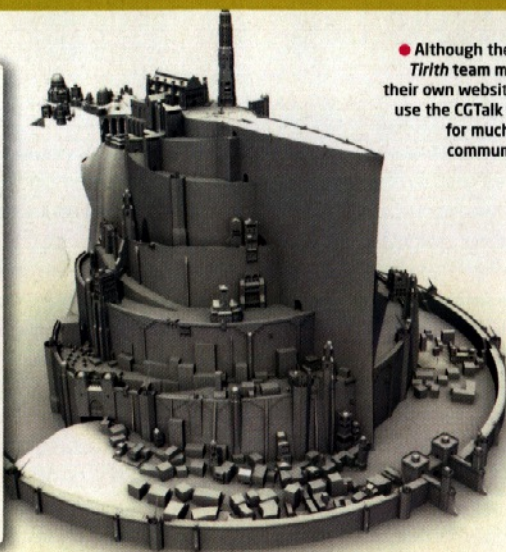27

DURATION
N/A

CURRENT STATUS
In production

WEBSITE
www.minastirith-project.
com

● Although the *Minas Tirith* team maintain their own website, they use the CGTalk forums for much of the communication

● *Aegis: 2375*'s eight-strong team is currently creating a two-minute promo clip, with the ultimate goal to create half-hour animated episodes for sale as DVDs as well as the possibility of a real-time strategy game

CASE STUDY | The Minas Tirith Project

Online collaboration isn't only used to create movies. For *The Minas Tirith Project*, the aim was to produce a 3D model of an entire virtual city

Inspired by the city of the same name in *Lord Of The Rings*, The Minas Tirith Project was started in February 2004 when online collab artist 'dodo3D' posted the following message in a forum: "I really dream of modelling this city with all the details and interiors of it [sic]... so anyone want to share the dream with me?" The scope of the project increased when graphics programmer Flavien Brebion joined the team three months later. He proposed creating a real-time viewer to enable people to explore the fully-textured model that the team created.

"Having started work on the project a year ago now, we're progressing steadily," says modeller turned project leader, Pier Jannsen. "We had to figure out the best way to managing a project of this scale. None of us had a lot of management experience, so there was a lot of trial and error, and it's still proving difficult in some areas.

"In the first half year, it was quite tricky to find talented people who wanted to work on the project. A fair number of people joined, but with all due respect, they weren't the best artists. As the project progressed, the situation has improved and now we've even got some pros working on it, which is a

real boost. One thing that did help was reaching the front page of CGTalk. The number of people who then wanted to join was really insane. But finding people to do jobs other than modelling has been much harder. I've been actively searching for a talented texture artist for months."

In order to gauge the quality of potential team members, applicants are asked to explain in writing why they want to join, and to supply a portfolio or résumé of their recent work. Since the project is being run as much as a learning experience as for its end results, inexperienced artists are free to apply, provided that they can demonstrate sufficient commitment.

Despite this range of skill levels, Jannsen says that it has been relatively easy to ensure a constant level of quality on the project. "Myself and the other members try to give as much constructive criticism of each other's work as we can - especially when it's in a work-in-progress phase. The most challenging task has been keeping things moving forward. The fact that a lot of people just drop out can make this very hard. And it's obviously hard to maintain a quick and constant pace when everyone is helping in their free time."

Regardless of the amateur or professional ambitions of the project, a project leader will naturally want to recruit the best talent. This is one of the key benefits of putting together a team of remote collaborators. Geographical and even cultural barriers are removed, giving each project the potential to tap into a talent base several million times larger than a land-locked one.

Good advertising, usually via forum postings, is the key to attracting the right people. The trick is to highlight aspects of the project that will entice talented artists, show concept work that does justice to the concept, and try to demonstrate that you're committed to seeing the project through.

Once good lead artists have come on board, it is usually possible to be more flexible about subsequent recruitment. Regular readers may recall a letter in issue 66 of *3D World* from 'softdistortion', the leader of the collab team shirowproject. Softdistortion actively promotes the skill-building aspect of online collaboration, with individuals free to jump on board the team then come and go as they please. Core members are simply those who stick with it. Along the way they are provided with informal training and encouraged to develop their skills.

"It developed in response to seeing new members come in right away, get overwhelmed, and soon drop out," explains softdistortion. "Now we start them with a bit of introductory 'on the job' training, tailoring some work to their level, with a bit extra thrown in to expand their skills. We find it best to accept everything members complete, fitting their efforts into our production and choosing either to use it in the foreground or background, rather than asking for major redos."

"Being selective about who to take on isn't really a problem," agrees Bruce Fitter. "When you look at the whole production process, not every task requires the best artists in the world. And you don't really want to waste the best people by getting them to work on the more basic elements."

LONG-DISTANCE HASSLE

Although access to talent anywhere in the world is a huge boon, the vast distances between team members throw up particular challenges. While deadlines can be very loose, a project still needs to be broken down into well-defined tasks, with each team member kept in the loop as work progresses.

None of the teams we spoke to had encountered any serious hardware or software compatibility issues. But while it's the norm to let each team member use their own favourite 3D app, this makes good data management all the more essential. Giving everyone access to files on a central server is efficient and avoids the possibility of a key member leaving and taking essential data with them, but the

larger the project or team, the more work needs to be done simply keeping track of files, ensuring people always work with the latest versions, and that backups are on hand in case a file is physically or artistically ruined.

With regard to communication, be aware that time zone differences add small but cumulative delays, while messages via email, MSN Messenger or forum postings inevitably lack the warmth, motivational potential and transparency of face-to-face discussions. Text can also be misinterpreted. Throw in cultural differences and it's possible to unintentionally bruise egos during the critique process, making a more relaxed attitude to project management essential.

"I haven't really found communication to be a major issue," says Hollefreund. "We all have lives outside of the project, so it's not a big deal if we have to wait for an email. And in some instances we use Skype to chat live, which is a good way to touch base and make sure your team leads are on the same page."

SEEING IT THROUGH

Now for the bad news. Although bursting with potential, the online collaboration scene is also filled with the wreckage of abandoned projects. Kirk Stanke suggests that even a five per cent success rate is an optimistic estimate. Some are simply projects that are advertised, usually badly, and then get little or no response. Others show every sign of succeeding, but then grind to a halt for any number of different reasons.

"It might be due to work or family demands, or team members becoming overwhelmed or just running out of steam," says softdistortion. "But we can also fall victim to a lack of real professional experience or teamwork skills. Ignorance of what goes into a full 3D production can eventually catch up with a team."

Many project leaders are just not aware of how much time is going to be spent in day-to-day management, even if the team is small. "It's easy to find yourself suddenly devoting 40 hours each week to your project," says Stanke. "If you have a regular job, family and friends, something has to give, and the project is the logical first choice."

Team members and even leaders can also easily lose interest because a sense of progress is lacking or the quality of the work is disappointing. Once a key member leaves, it's often hard to find a like-minded and equally talented replacement.

Overambitious projects also tend to falter. Stanke believes this is probably the greatest single problem with the collab scene: "Ambitious project leaders are usually good at communicating their ideas and

● "We try to go through the process in stages, creating concept art for the entire project, then modelling, shading and eventually rigging," explains Victor Legerstee, project leader of Aegis: 2375

enthusiasm, which attracts team members and gets things moving. But these projects make small advances towards a distant goal, ignoring minor ones that could show better progress. That quickly demoralises even the most dedicated team."

And yet, despite the slim chance of running or joining an online collaboration that will ever reach completion, much less make a profit, many artists are willing to take the risk. The simple fact is that there's

> "IF A PROJECT ISN'T ENJOYABLE, IT'S DOOMED. A PROJECT LEADER SHOULD TRY TO KEEP IT FUN AND AVOID ACTING LIKE A CONVENTIONAL BOSS. FIGHT THE EGO."
> SOFTDISTORTION, TEAM LEADER, SHIROWPROJECT

really little or nothing to lose, and such projects can be enormous fun, personally fulfilling, and highly educational. The exposure they offer can also be invaluable, especially if a project becomes something of a cult, underground phenomenon. "There have been countless instances of CGTalk members finding jobs after their work has graced the front page, and I don't see why it couldn't happen with a collaboration effort as well," says Stanke.

Perhaps Daniel Hobbs best sums up the nature of the online collaboration scene when he says the goal is not so much to create something entertaining as to show people what they can achieve by working together. "If I'm successful," he says, "I'll actually keep losing my staff as they get snapped up by professionals." ●

TEN TIPS | Online collaborators offer their advice to potential team members and project leaders

If you want to get cracking on your own online collaboration project then heed these wise words from those in the know...

1 DO YOUR HOMEWORK
"Search a team leader's forum messages to see if they have any experience, and to establish whether they have a good reputation in the collab community."
softdistortion, team leader, shirowproject

2 DEVELOP A THICK SKIN
"Leave your ego outside. Be prepared for the most critical of opinions during production, and after the film is complete."
Adam Benton, CG designer, SW: Revelations

3 WALK BEFORE YOU RUN
"Gain experience. Join a functioning team or at least spend a bit of time looking at how they operate before you try to start a project of your own." softdistortion

4 LEAD BY EXAMPLE...
"If you're the team leader, do everything you can to show the team that you are dedicated enough to be trusted with their time and energy." softdistortion

5 ...BUT DO DELEGATE
"Assigning tasks gives you time to provide valuable critique of work submitted, and gives the team a greater sense of importance." Kirt Stanke, forum leader, CGTalk.com

6 ADVERTISE WISELY
"Advertise carefully. There is a fine line between showing too much so that you have nothing to market and showing enough good work in order to recruit good people." Jason Hollefreund, project leader, The Gabriel Strain

7 MANAGE GENTLY
"Run a team less as a business manager and more as a community leader. You have to take almost the opposite approach you would with normal team management." Bruce Fitter, director, The Dagger

8 REWARD EACH OTHER
"Promote finished work in other forums or arrange for 'production crew' T-shirts to be made. And never underestimate the power of a 'thumbs up' emoticon." Kirt Stanke

9 STRESS THE POSITIVE
"Be flexible in all areas, including your expectations of other team members. And make it a habit to commend the positive things in each other's work." softdistortion

10 BE REALISTIC
"A lot of teams expect to match the quality of work created at commercial studios. Either keep it simple and go for quantity, or be prepared to spend countless months building assets first." Victor Legerstee, team leader, Aegis: 2375
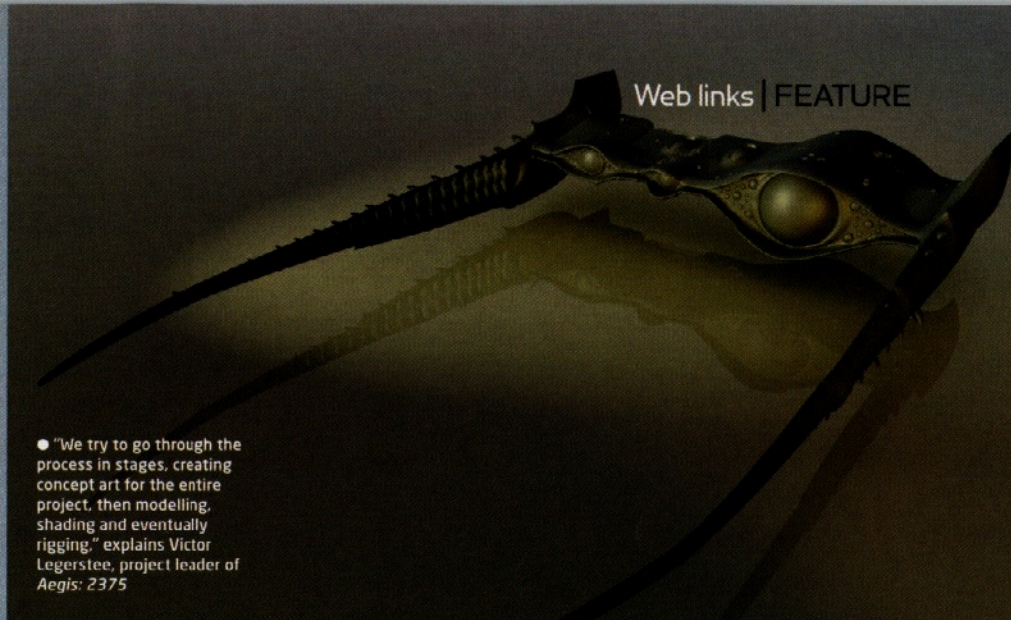
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TUTORIALS

TECHNIQUES / TIPS / TRADE SECRETS

BODYPAINT 3D 2

texturing t-rex

ON THE CD
● *BodyPaint 3D 2*
demo and full
supporting files
SEE PAGE 115

Good texturing work isn't just about digital painting: when a completed texture map is applied to a model, seams and smears may appear. Discover how to fix them with BodyPaint 3D **BY KEVIN JENKINS**

Texturing has always been a vital part of the process of creating 3D imagery. A good Texture map will make an average model look great, but a bad Texture map can make a great model look awful. For me, the real tests of a texture artist's skill are organic creatures: not only because the models are difficult to texture, but because creature painting is an art unto itself.

Fortunately, with the release of *BodyPaint 3D 2*, the whole process has been made a lot easier. Maxon's 3D painting package isn't the answer to every prayer, since *Photoshop* is still a must to create the best Texture maps possible. But where *BodyPaint* excels is in speeding up the process and in solving the problems that arise when texturing difficult organic surfaces.

SIGHT FOR SAURUS

If you're not already a *BodyPaint* user, you can find a demo of the software on this issue's CD. Two versions are included: one integrated with *Cinema 4D 9*, and a standalone version for users of *3ds Max, Maya, XSI* and *LightWave*. The integrated version is the best one to use here. In this tutorial, I'll be explaining how to use *BodyPaint* to texture the ferocious-looking dinosaur on the right.

The aim is not to teach you how to paint textures – for that, see our 'Skin deep' articles in issue 65 – but to focus on the best way of getting those textures onto your model, and of resolving common problems that arise during the process. Think of it as more of a guide to which tool to use, and when. Over the course of the walkthrough, I will take you through the process of setting up your model and getting the main texture maps into the all-important UV layout, then explain how to de-smear those maps using some of *BodyPaint*'s projection tools.

You can find all of the necessary files for the project on the CD. We've included two versions of the dinosaur head: if the high-res model gets too heavy for your machine you can work on the low-res, since the UV layouts are identical. Hopefully, this example should give you clues as to how to troubleshoot your own projects. All of the techniques can equally be used on buildings, cars or mountains – you just have to apply them in a logical fashion.

Kevin Jenkins is Senior Matte Painter at Framestore CFC. He has previously worked on *Walking with Dinosaurs: Sea Monsters, Beyond the Sea* **and** *Alien Vs. Predator* **[w] www.framestore-cfc.com**

STAGE ONE | Painting the Colour map

01 Open the dino head files. Go to Object > Scene and create a new camera. Call it side_RenderCam. Pull it back in X in line with the model for about 1000 units. Adjust the focal length to zoom back in on the model, and move the light to the same position. This creates a view akin to the *Cinema 4D* side camera. In the Object browser, choose File > Cinema 4D tags > Protection
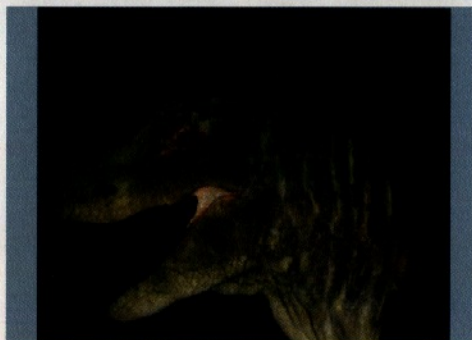
02 Change your Render Settings output so as to render a square image. Using multiples of two is always good working practice: for example, 512x512, 1024x1024 or 2048x2048 pixels. Render the view through the side_RenderCam. From this, do a concept sketch of your colour scheme. This is your road map, and planning at this stage will pay off later.

03 In your paint application of choice, paint up the side render of the model. I rarely use *BodyPaint* at this stage, as *Photoshop* or *Painter* are better suited to straightforward 2D work. Note: this stage could form an entire tutorial in itself. Look to nature for your reference material, and use your artistic flair. If you want to skip the painting process, a completed Side map is provided on the CD.

04 In *BodyPaint*, hit [Ctrl]+[N] in Material browser. Load the Side map into the Luminance channel, disabling other channels. Drop the shader on the model and, under Tag Properties, change Projection type to 'Camera Mapping'. Drag-and-drop your side render camera into the Tag box's camera section and use equal Size X and Y values: for example, 2048x2048. Your map should line up perfectly.

05 Select both the UVW tag and the model name in the Object browser, then select Render > Bake Texture. You need *Cinema 4D* for this: for some reason, it isn't in the standalone version of *BodyPaint 2*. Only render luminance, as you don't want any shading on the map. In the Resolution section, type in the values for your square and bake out the map into the UVs.

06 When baked, duplicate the image in *Photoshop*, flip it and delete the redundant halves to give you both sides. Load it into a new shader's Luminance channel. You'll see it looks great from the side but smears all through the middle section where the projection angle was acute. Viewing maps through the Luminance channel like this makes it easier to spot such potential problems.

STAGE TWO | Fixing problem areas
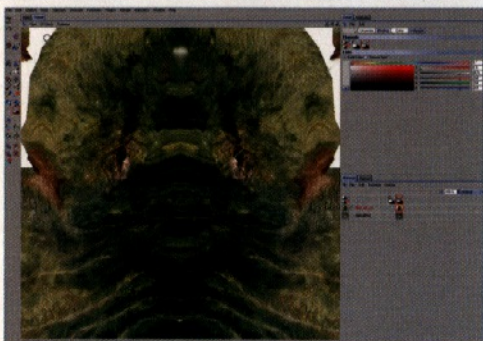
07 In *BodyPaint*, flip into UV Edit mode (use the box below the File menu with the arrow on it to switch between the various working modes and layouts), select the model and show the map from the Texture pull-down menu. It's quite obvious from the smearing where the problem areas are, so it's back to painting again. If an area is smearing, paint it out.

08 Switch to the *BodyPaint 3D* menu and then to BP 3D Paint and make sure the Pencil icon is clicked on next to your texture. Right click on the square Map icon to create a new layer. Try to paint as well as clone, being wary of mushy-looking areas if your cloning is too soft. It's at this stage that you might want to add some variation into the two sides of the map.
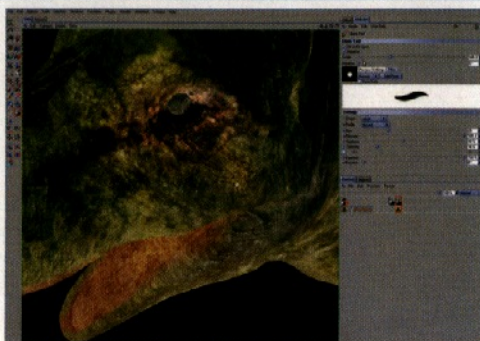
09 After painting out most of the smears, make your way around the model, looking for problem areas and cloning as you go. Make sure that, in the Clone Tool attributes, you've clicked All Visible Areas and that, if you're using the Eyedropper to pick colours, you've clicked on the Texture button and All Visible Areas, or it won't behave correctly.

STAGE TWO (Continued) | Fixing problem areas
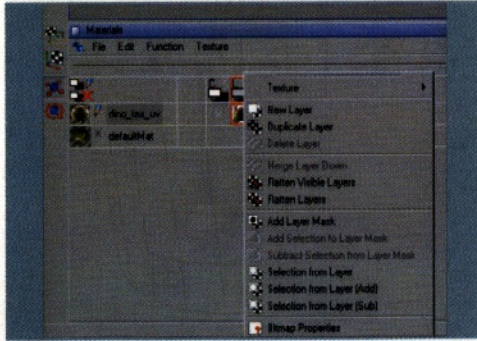
10 Tilt the head so you can see into the mouth. This is a difficult areas to project anything into, so start in the UVs. To make life easier, select a paint brush and a bright colour, make sure you're in Paint mode, and go to the Material Editor. Make sure you have the Pencil icon turned on next to the Material swatch, then right click the swatch to the right and create a new layer.

11 Select the Brush tool, adjust its size in the Attributes panel and paint an outline around the mouth area indicating all the areas where the outside skin of the creature will change from outer skin into the fleshy inner mouth.

12 This outline will give you an indication of the areas you need to change. In between the limits you've marked out, start to paint a new texture for the inner mouth. For this, you could either work directly in *BodyPaint*, or you could right click the Texture swatch in the Materials Editor and export a map so that you can work on it in *Photoshop*. Start to paint the flesh areas.

13 If you created the map in *Photoshop*, save it and re-import it back onto the head model by double clicking the material ball, selecting the desired channel and then replacing the old map with the new one by clicking on the arrow by the word 'Texture'. It should look something like the picture above.

14 Use the Clone tool on the inner mouth to clone out seams where the models overlap. You can clone from an image as well as the model. Click on the Textures panel, then select the image you wish to clone from. Click on the blue pushpin and drag the Texture panel to a new window or right click and undock it. Select images from the Texture menu.

EXPERT TIP

Using RayBrush view

If the Projection Paint mode maps seem blurred, RayBrush render view will help as it lets you clone and paint in Projection Paint mode on a final render, giving you a good idea of the finished quality. In *BodyPaint 3D* and BP3D Paint mode, activate the Projection Paint mode. Just below that, press the Glass and Brush icon to activate RayBrush view. Wait for the render to complete, then paint or clone as normal: you'll notice the difference in the quality of your brush strokes. Just remember to re-render each time you move the camera.

STAGE THREE | Using Projection Paint
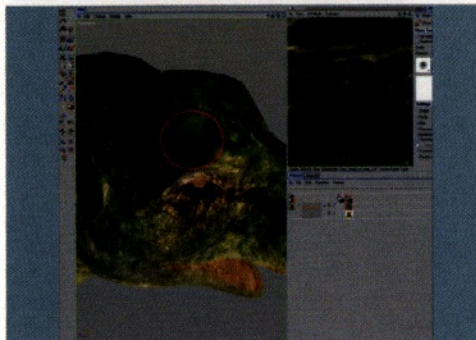
15 Turn the model over to look at the top. Even though the maps were cleaned up in the UVs, there is still some smearing on the tops of the eyes. Because the UV layout is not as good as it could be, the map needs to be 'projection-painted' onto the model to allow for unequal UVs.
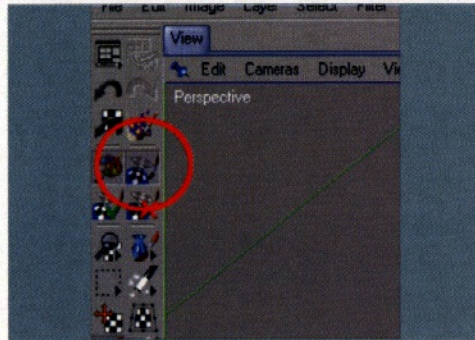
16 On the toolbar to the left hand side of the screen, press the button that shows a map floating above a surface. You should then get a green border to your Main view. This means you're in Projection Paint mode. It allows you paint on to the surface of the model without worrying too much about how your UVs are laid out.
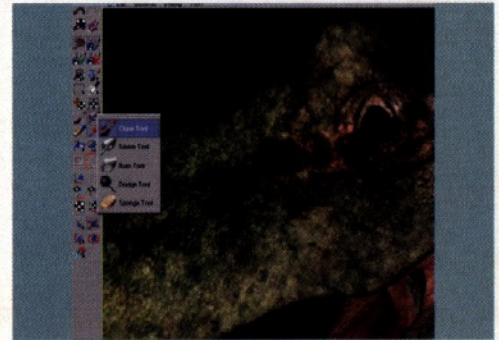
17 Everything you paint or clone will be directly from the camera angle of view. Don't move the camera until you have finished painting. Click the tick in the Main toolbar below the Paint Palette icon to accept what you have painted or the cross to discard the projection. This should solve a lot of your map stretching problems.

STAGE THREE (Continued) | Using Projection Paint
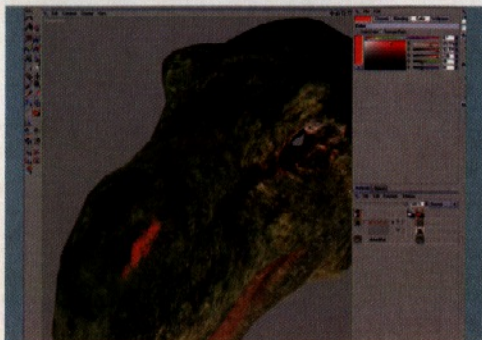
18 BodyPaint 2 works just like Photoshop, but in 3D. You can even use all the different layer modes, such as Overlay and Multiply. For example, the delicate areas of any creature's skin, such as the eyes or nose, are often a lot pinker. To mimic this, you can create a new layer above the main map, then paint in a red or pink. Break up the brush a bit by playing with the Jitter and Spacing.
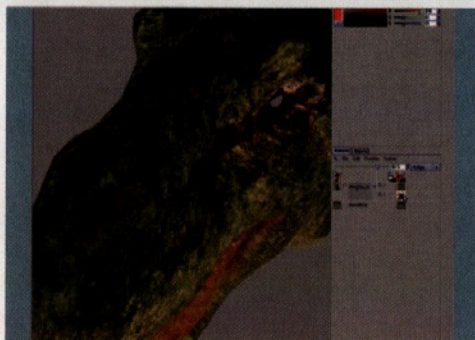
19 After painting, you can then adjust the opacity and mode of the layer in the Material panel. Multiply or Overlay are always good places to start. You may also find that using various shades of red or pink rather than a flat single colour is more effective.

20 After all this work, you should have quite a good pelt. This is now the time to make any final grading adjustments to the skin, but if you do, make sure that you are adjusting the image consistently. If you change anything on just one edge and not all over, seams will start to appear again.

STAGE FOUR | Creating the Bump and Specular maps

21 Now create the Bump map. Duplicate your image in Photoshop. Save it as a separate file, then select Image > Mode > Greyscale. Creating a Bump map in this way means it will perfectly align with your Colour map. Use the Dodge and Burn tools to even out the values in the map. Reduce the settings initially so they have only a slight effect until you are used to creating an even map.
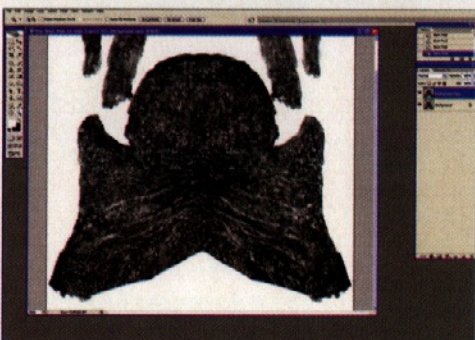
22 If you look at this example, you can see that, by carefully lightening the dark areas of the map and doing the opposite to the light areas, you can create an even Bump map. But this leaves you with a slight problem: the light creases in the skin are now white but they should be black as we want the bump to take them inwards.

23 You can solve this problem in a number of ways. I chose to turn the Colour map back on and paint in where the creases should be on a transparent layer above it. This makes it much clearer for you to see. An alternative would be to duplicate the layer and invert it, then use a Layer mask.

24 Drag this layer back onto your Bump map. Flatten the image (select Layers > Flatten Image), and save the result. The Bump map should now be ready for use, so it's time to work on the model's specular highlights.

25 You can create the Specular map from the Bump map, but it needs to have more contrast. Dodge and burn areas that need evening out after you've adjusted the image's Levels or Curves. Pull the whites down and the blacks up to make the image more 'crunchy'.
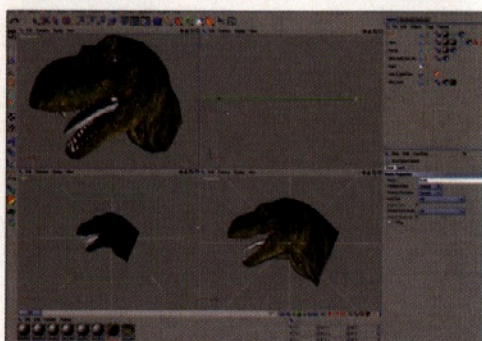
26 Import teeth, tongue and eye models. You can also place the final maps on the head to get an idea of how it's looking. Double click the Head map's Material ball, turn on the Colour, Bump, Specular and Specular Colour channels and load the maps into appropriate slots. In a production environment, you'd apply a Displacement map, but BodyPaint (SE) doesn't support sub-polygon displacement.

STAGE FIVE | Finishing the eyes and teeth
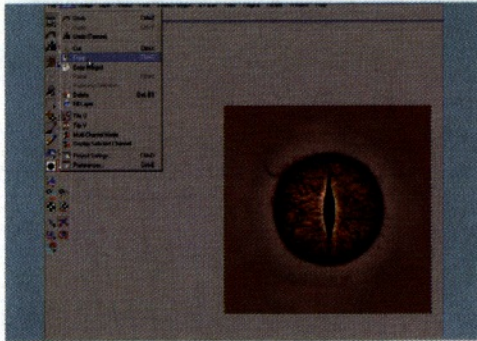
27 The method I'm going to show you for the eyeball is longwinded, but it demonstrates one of *BodyPaint*'s strengths. Open the map through the File menu. If you then go to the Texture pane and use the Texture pop-up, you should see your eyeball map. Choose Select > Select All, then copy.
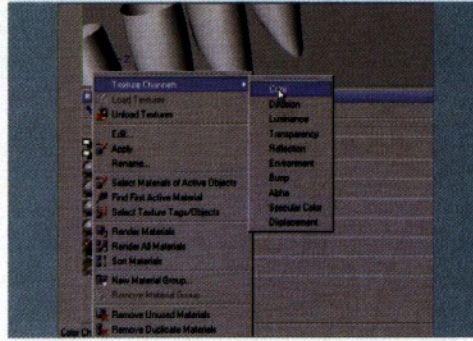
28 Create a new material and drag-and-drop it onto your eyeball model. Click the cross button next to the icon in the Material manager so it becomes a pencil, right click on the texture ball and then create a new colour channel.
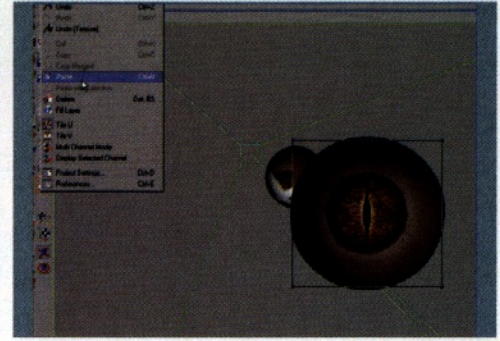
29 In the 3D window, line up your eyeball the way you want it. Turn on Projection Paint mode, making sure you have a green border surrounding the window, then select Edit > Paste. You should see a square with pull handles allowing you to drag the Texture map around over the model.

30 After you have pasted the map into Projection Paint, there are a number of options in the Attribute Editor to allow correct placement of your map. Scale, Rotate, Perspective and Shear are all accessible after pressing the corresponding radio button. When you're happy with your adjustments, click Apply to accept the changes.
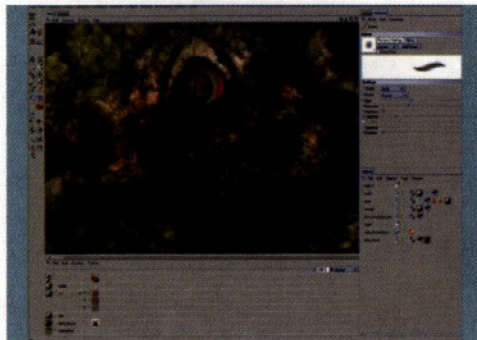
31 Turn the main head model back on, but turn off the Pencil icon next to the Main Head map Material ball. This will enable you to add details to your eyeball - for example, darkening the corners of the eye - without overpainting your main model.
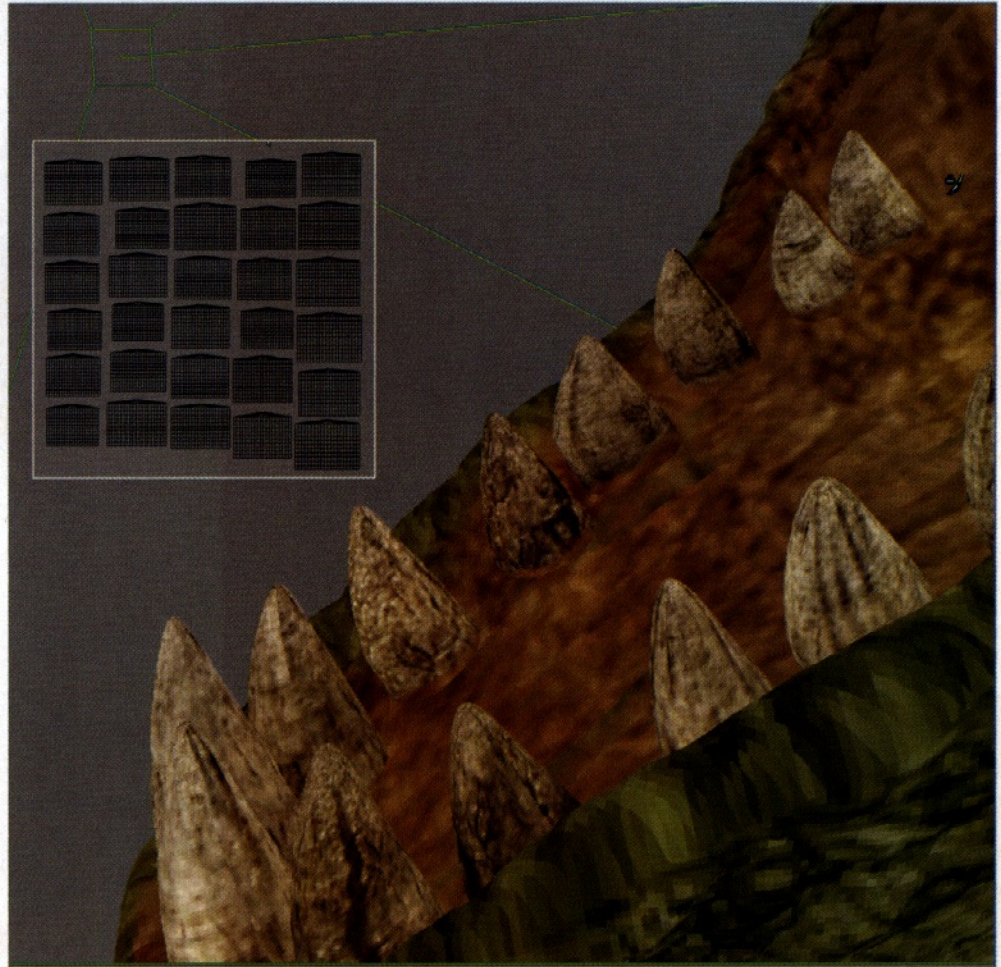
32 Time for the teeth. I've laid out separate UVs for each tooth (see inset image). This map can be approached in a couple of ways. The best is to paint into the UV map directly in *Photoshop*, but you could Projection Paint directly onto the model. When the Main map for the teeth is finished, make sure it's inserted into the Luminance channel only, that the Main Head map has only this channel selected, and that the Pencil icon for both these materials is on. This allows you to paint across multiple models to clone or paint around the teeth where they meet the gum. The final stage is the tongue. You can complete this for yourself, using the techniques set out earlier. If you get stuck or need inspiration for this, a supplementary walkthrough can be found on the CD. Good luck! ●

TRADE SECRETS

From 2D to 3D

Improve your photogrammetry work with these tips for getting more out of ImageModeler 4   **BY MAT BROOMFIELD**

T he ability to convert photographs into textured 3D models is invaluable, enabling artists to quickly create accurate representations of objects for use in animation or architectural visualisation. The process, known as photogrammetry or image-based modelling, requires a series of photos of the object in question, taken from a range of angles, and a specialist image-based modelling package. The resulting models can be exported to your favourite 3D application for finishing, and - if you have done your job carefully - will even be accurate enough for use in architectural planning.

However, image-based modelling also has its limitations: the software won't model what you can't see, may have problems recreating concave or complex organic surfaces, and, to produce the best results, requires objects with a lot of detail that can be seen in multiple shots.

In this article, we'll be exploring ways to avoid some of these problems. For this, we'll be using *ImageModeler 4*, a special trial version of which can be found on the CD. It provides 15 hours of unlimited functionality, and comes with a range of starter tutorials. Work through these first.

ImageModeler provides two ways of modelling. The standard method is where shapes are created using simple primitives. This lends itself to conventional scenes with lots of regular shapes, such as architecture. The more complex method is Point Cloud modelling, where you define a cross-referenced array of points and use these to generate a mesh. This is best suited to creating irregular organic shapes, such as sculpture. The key to success in both cases - and, indeed, to the whole process - is the quality and clarity of your photography and your calibration.

Mat Broomfield has been a technology journalist for 18 years and writes regularly for *3D World* and *Computer Arts*. Additional technical advice was supplied by Realviz www.realviz.com

01 The key to good photogrammetry is good photography. Whenever possible, take photos using the same camera, camera orientation, lens, zoom, and lighting. This allows the program to most accurately determine the lens characteristics, and thus compensate for any inherent distortion. You might have to physically move nearer or further to the subject as required. Frame the shot to include a little of the background.

02 You can never take too many photos - you can choose the ones that best reveal the data. While you'll want to take each shot at an angle that displays two or three planes at once, if you need *ImageModeler* to reconstruct inaccessible object textures from visible data, take some photographs from straight on. There will be less distortion when used for interpolation.
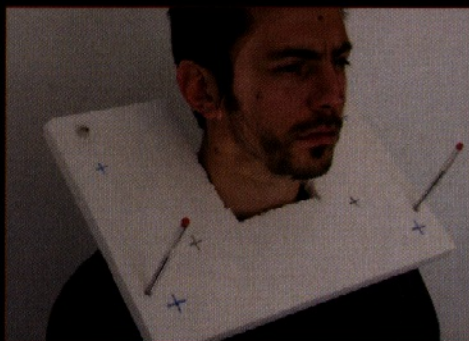
03 The more markers, the more accurate the calibration will be - ensure your shot has plenty. Physically place your own survey posts, pen marks, ping-pong balls, cars, drawing pins, or other reference objects in the shot before you take your photos. Reference markers used in calibration do *not* have to be part of the finished geometry.

04 If the lighting of your object makes placement of calibration points or helpers difficult, duplicate your photos and use *Photoshop* to increase the contrast of the doubles. These will indicate reference points that may exist. Provided you cross-reference marker points on both images, originals can be used to extract textures, and *ImageModeler* can ignore the high-contrast duplicates.

05 It's tricky to model concave surfaces such as the inside of a car wheel, but if you focus on creating an accurate calibration, preferably using Corner and Planar constraints, you can then manually shape the concave surfaces. The normals may become inverted, making the surfaces seem transparent - select the misbehaving points and use *ImageModeler*'s Invert Normals option.

06 Try to use calibration reference points that are visible in as many photos as possible, and mark them accurately in every image. Extremities (such as building corners, flag poles or aerials) and solitary objects (such as cars, telegraph poles, or trees) make excellent markers because they're easy to identify in multiple shots.

READER OFFER ℹ

Save 20% on the full version of ImageModeler 4

Realviz is offering *3D World* readers a 20% discount on *ImageModeler 4* (RRP: $1,380 / €1,200 excluding tax). The offer is only valid for purchases of the full version of the software from the Realviz online store at: **www.realviz.com/ purchase/buyonline/index.php** until 30 September 2005. You'll need to enter the discount code **3DW20SYT** as the last step in the purchasing process to qualify.

SOFTIMAGE|XSI

Get started in animation Part 4

In the fourth and final part of our series of beginners' animation tutorials, we'll continue to develop our hopper's character, by making him bounce around in a rather forlorn fashion

BY OLA MADSEN

hroughout this four-part tutorial series we've been focusing on the basics of 3D animation. During the course of the series our hopper has evolved from being a lifeless object to a joyful character with a will (and rig) of his own. Up until now, we've put together the animation by directly moving and scaling the geometry of the hopper at different frames.

While this approach is very straightforward and time efficient, you don't have any real control of the hopper's posture or facial expression, even less the ability to change these over time. Using the rig created in the last issue enables us to continue working in the same manner as before, but with the power to add additional details to the poses and the animation as a whole to develop our hopper's personality.

With personality comes such character traits as mood and temper, which in turn affect disposition and body language – a particular action will be performed in different ways an individual depending on their mood. While you may be upbeat and expectant when you bound off to the kitchen for your twelfth cup of coffee of

the day, your attitude – both mental and physical – will change if you find that someone has just helped themselves to the last cup. Your discovery will trigger surprise and disappointment, after which you'll slowly traipse back to your desk. So the speed at which a person moves can depend on whether they're happy or gloomy, as can their gait.

WHAT YOU NEED

As usual, all the files needed to complete this tutorial can be found on the CD. If you don't yet own a licence for *Softimage|XSI* the free educational version (*XSI Mod Tool*), can be downloaded from **www.softimage.com**. If you've missed any of the previous parts in this series, they can be downloaded from our website, **www.3dworldmag.com**

When he's not running around his Swedish studio, high on his twelfth cup of coffee of the day, Ola spends his time animating everything from medical treatments to teddy bears
[w] www.digitalcontext.se

STAGE ONE | Setting up a slow bounce cycle
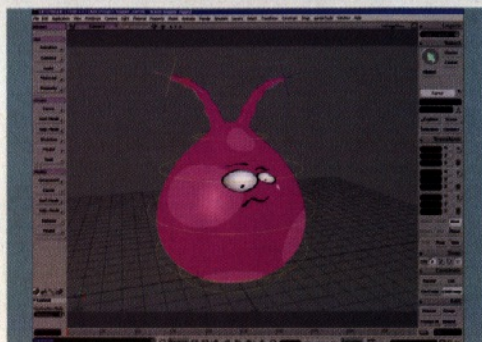
01 This being his last appearance in *3D World* (as far as we know), it's understandable if our hopper is feeling a little down. Since he's now exhibiting a distinct mood we'll need to pay even more attention to the different poses that we've created in previous parts in the series. Open hopper_rigged.scn, and let's get started.
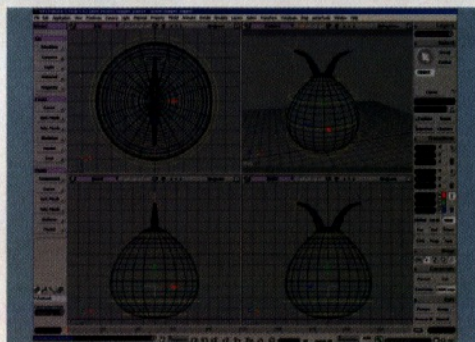
02 We'll use the Null object merely to set the general positions for the hopper, and use the rig we created last issue to create the actual poses. The rig consists of six circular curves, which in turn control a Cage deformer. Select the Null and hit [V] to activate the Translate tool. Set a keyframe at frame 1, and another at frame 6 (without actually moving the hopper) to set the first contact position.
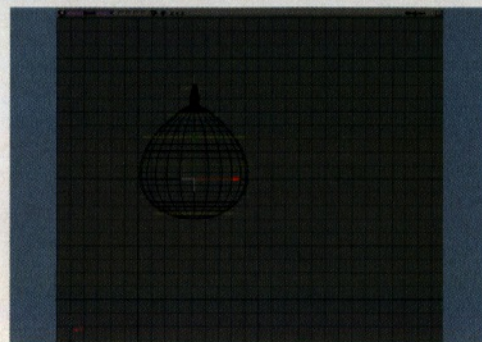
03 While each bounce took just under a second in the previous tutorials, the hopper's current state of mind will slow this action down to about three seconds. Go to frame 15 and, in the Front viewport, move the hopper about nine units up and four units to the right. Set a new keyframe to set his high point.
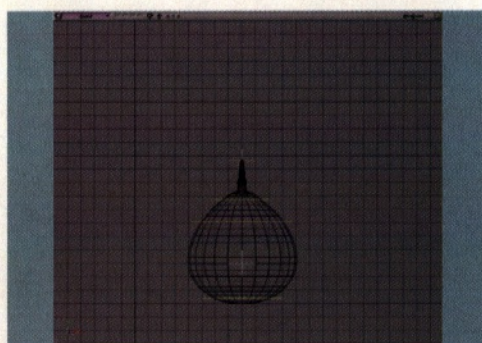
04 Although the pace of the bounce is significantly slowed, the influence of gravity is unchanged. The time spent in the air should therefore be about the same as before. At frame 22, move the hopper another four units to the right, and lower him so he touches the ground again. Set a keyframe, and set another at frame 70 to set the duration for the hopper's second contact position.
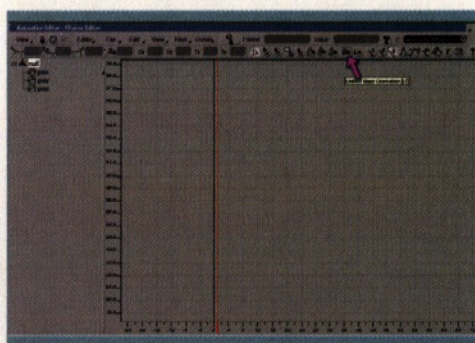
05 With the Null still selected, press [0] (zero) to open the Animation Editor. Select the keyframe for the Y position (displayed as 'posy' in the Animation tree) at frame 6. Turn off Unified Slope Orientation to enable the slope handles to be modified independently, and set the left slope handle's length and angle to 0. Set the right slope handle's length to 3, and change the slope angle to about 25.
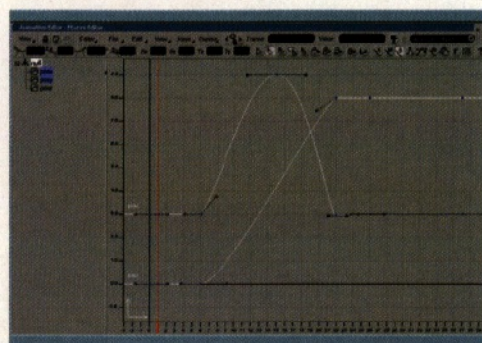
06 Select the posy key at frame 15, and set the length of both handles to 3.5. Select the posy key at frame 22, and set the angle to 0 and the length to 1. Select the posx key at frame 6, set the angle to 0 and the length to 3. Select the posx key at frame 15 and delete it. Select the posx key on frame 22, and set the left handle's angle to 14 and length 2.5 and the right angle and length to 0.

STAGE TWO | Expressing emotions
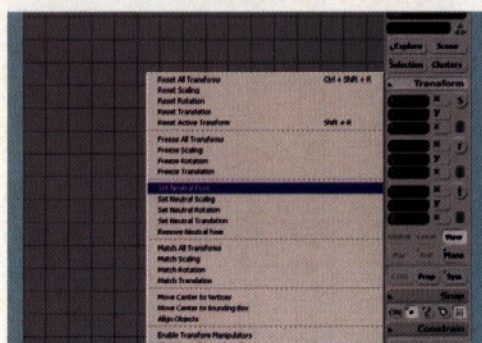
07 The first thing to do is to create a neutral state for our rig. Select all the curves and click Transform > Set Neutral Pose. It might be a good idea to reset the curves every now and then to avoid them drifting off in an unpredictable manner; this is done by selecting the curves and clicking Transform > Reset All Transforms.
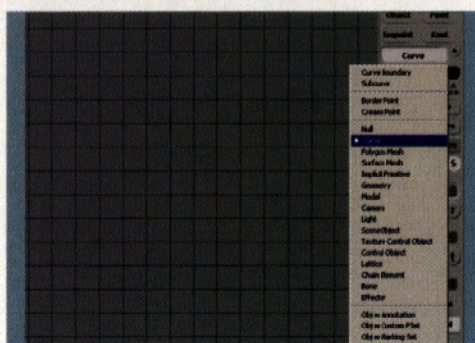
08 Next, set the Selection filter (located in the Select Panel) to Curve to make the following steps a whole lot easier. Return to frame 1 and select all the curves (six in total). Press [X] to activate the Scale tool, and make sure the centre of geometry (COG) and Volume (Vol) buttons are enabled. Scale the curves down to about 0.7 for the Y axis to squash the hopper.

09 Translate all the curves downwards until the bottom of the hopper is just below the ground. Move the two bottom curves slightly upwards, so he stands flat on the ground. Next select the three top curves and rotate them slightly (negatively) along the Z axis to give him a hanging or sagging posture. If necessary, you can reposition the curves slightly to maintain a smooth shape for the overall body.

STAGE TWO (Continued) | Expressing emotions

10 Select all the curves again, click the button labelled 'Animation', and from the menu choose Set Key at Multiple Frames. In the dialogue box enter 1, 70 and click OK to set a keyframe at both frames. Repeat with the Scale and Translate Tools activated as well, so both frame 1 and frame 70 have a key for each transform; this will ensure that our animation will loop seamlessly later on.
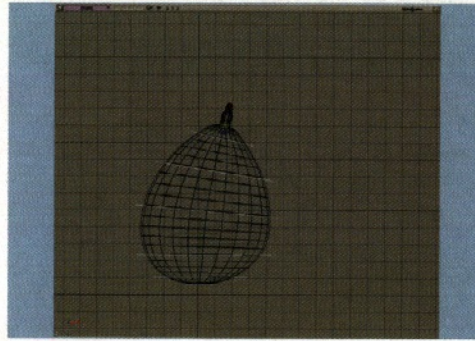
11 Go to frame 7 and scale the curves to about 1.2 for the Y axis. Move the bottom two curves down again, to reset a rounded shape on the bottom of the hopper. Rotate the top three curves a little further along the Z axis, and move them slightly to the right to get the hopper into a position of leaning forward. Set a keyframe for the Scaling, Rotation and Transformation (SRT).
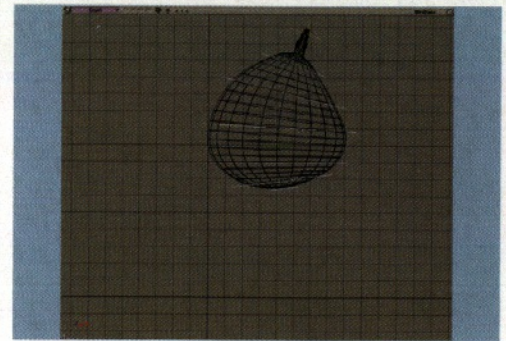
12 At the hopper's high point he'll continue to lean his upper body forward, and slightly lift his lower part, as he's preparing to land on the ground again. At frame 15 select all the curves and set the scaling back to 1. Rotate and position each curve to give the hopper sort of a bean-shaped appearance. Set a keyframe for the SRT.
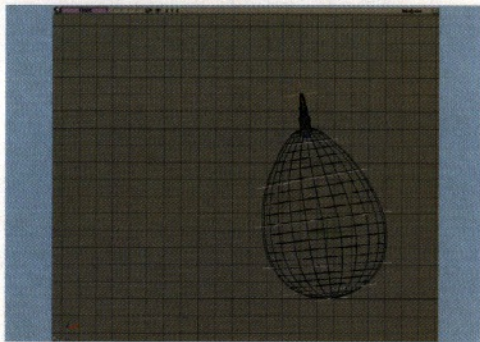
13 As the hopper makes contact with the ground, he should remain in a stretched-out pose, and not squash until a few frames later. At frame 21, select all curves again, and scale them to about 1.2 on the Y axis. Rotate them, and pull the top three slightly to the left to make him lean back. Position the curves so the bottom of the hopper just touches the ground. Set a keyframe for the SRT.
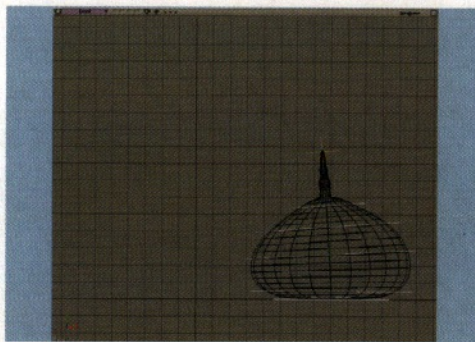
14 At frame 26, scale the curves down to about 0.7 on the Y axis to squash the hopper. Translate the curves downwards, so the bottom of the hopper is just below the ground. Then move the two bottom curves slightly upwards, so he sits flat on the ground. He should still be leaning slightly backwards, although not as much as at frame 21. Set a keyframe for the SRT.
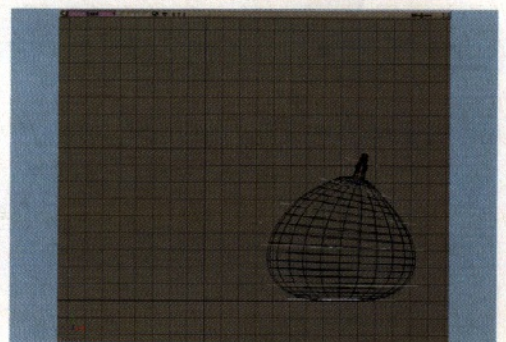
15 As both gravity and the hopper's momentum are played out at frame 37 he should regain his natural pose. Seeing that he's sad, he won't hold his usual cheerful posture; instead he'll rather have a sort of wilted pose. Set the scaling of the curves back to 1, and position them so that he sits on the ground. Rotate the curves to give a sagging appearance, and set a keyframe for the SRT.

STAGE THREE | Secondary action

16 While the movement of the ears is ultimately dictated by the hopper's movement, they do have a bit of a life of their own. Unlike the previous parts, you'll now need to animate them separately. As you disabled the influence of scaling when you set the constraint for the chains, you've been free to scale the curves without having to worry about distorting the ears.
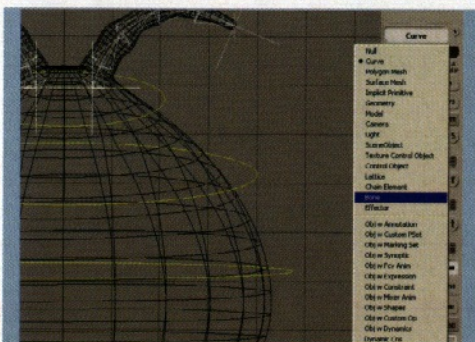
17 Start by setting the Selection filter to Bone. To create a smoother blend between the area where the cage deformer (which is controlled by the curves) and the ears (which are enveloped to the bones) meet, leave the first bone in each chain unanimated. While you could set keyframes to ensure that they'll stay in place, their transformation values shouldn't change.
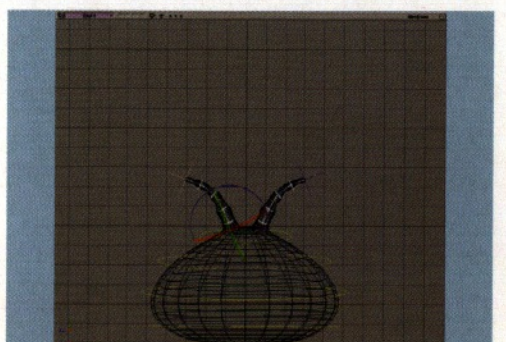
18 Go to frame 1 and select all the bones except the first in each chain, activate the Rotate tool and enable the Add Button Transform panel (this will automatically add rotation for each child in our hierarchy). Click the Animation button and, from the menu, choose Set Key at Multiple Frames. In the dialogue box enter 1, 70 and click OK to set a keyframe at both frames.

STAGE THREE (Continued) | Secondary action

Frame 21
Frame 15

Frame 26   Frame 37
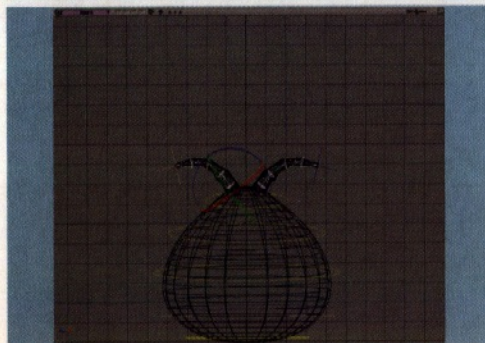
19 While the hopper will stretch as he's about to bounce off the ground, the ears will be toward his body. At frame 5, rotate the bones about 12 degrees along the Z-axis, to make the ears a bit wilted, and set a keyframe. The more you rotate the bones the more elastic/rubbery they'll appear. The extent to which you do this is really matter of your own taste.

20 As the hopper is reaching his high point, his ears should be about to return to their normal posture. At frame 15 rotate the bones about 5 degrees along the Z axis and set a keyframe. As he's falling to the ground the ears will tail the body, pointing in the air. Go to frame 21, rotate the bones so the ears become almost straight and set a keyframe.
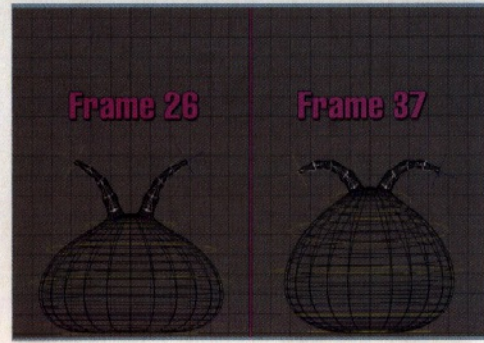
21 At frame 26 straighten the bones a little further and set a new keyframe. The energy from the squash and stretch will make the ears a bit more bent than normal at frame 37. Rotate the bones about the same amount as at frame 5 and set a keyframe. Scrub between the keyframes, preferably in the front view to get a better view of the ears' motion.

STAGE FOUR | Keep on bouncing
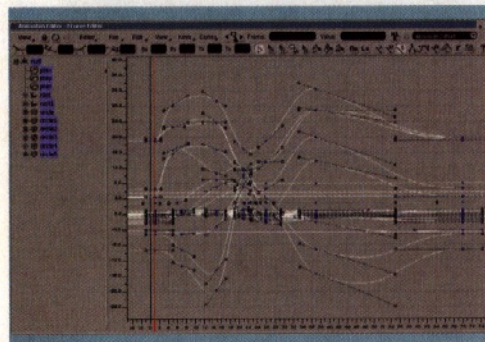
22 Select the Null object, the bones and all the curves and press [0] to open the Animation Editor. Now you want to cycle the animation, but you want the animation on the X axis to add to the current value, so that the hopper will continue bouncing forwards instead of going back to his original position over and over again.
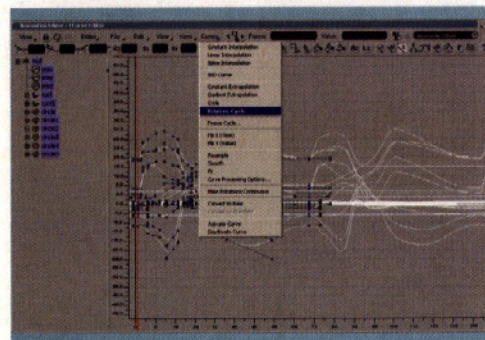
23 Expand the animation tree to see the Object's parameters, and select the fcurve for the Null's animation along the X axis (posx). From the Curves menu, select Relative Cycle. The values of the other parameters should cycle, rather than increasing cumulatively, so select all the other fcurves for all objects, and from the Curves menu choose Cycle.
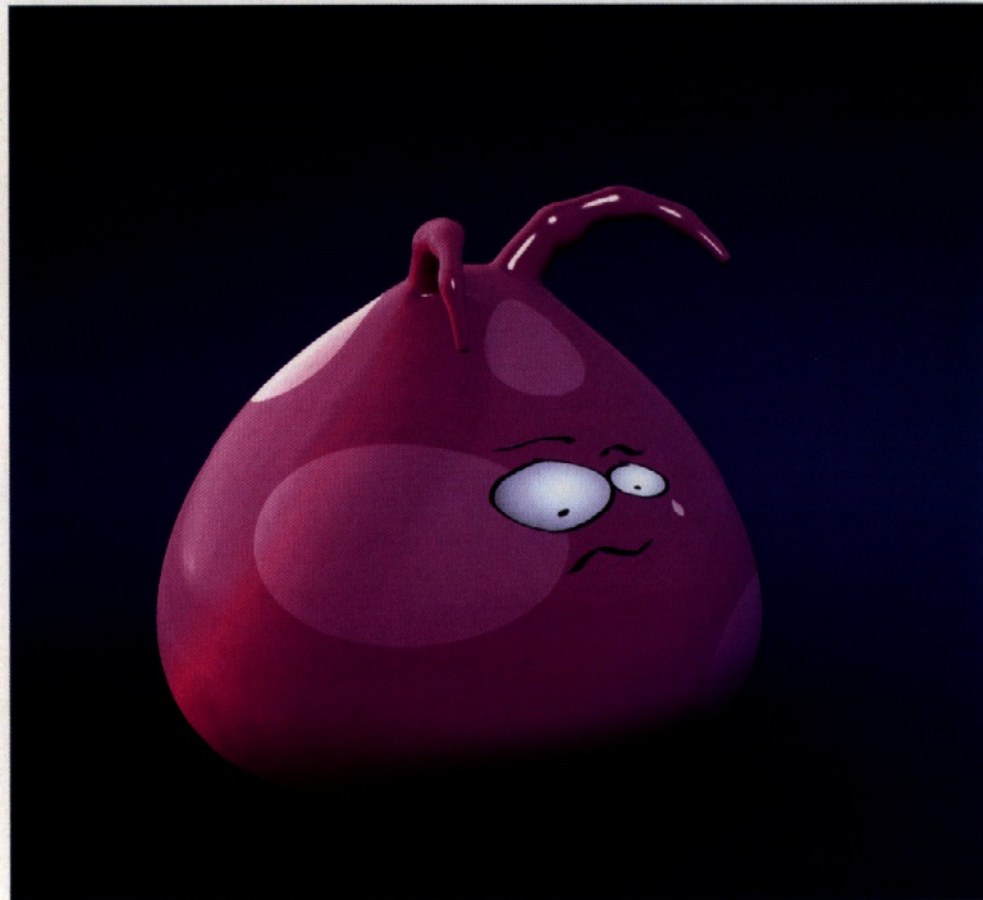
24 Because it might be a bit difficult to imagine how the different poses will play together, you shouldn't expect everything to be perfect the first time you see your piece. As you play back your animation you might find areas that should be refined or altered. If this is the case, simply return to the different poses, adjust the slope handles or modify their values, and set a new keyframe.

Throughout this series you should have gained a greater appreciation of the basic principles of animation and a basic understanding of how to put the theory of animating an object into practice. While you've now completed our 3D kindergarten, you really shouldn't leave your new faithful friend bouncing around in such a cheerless manner, so why not animate him jumping for joy? ●

Win a PURE PCIx render card

Enter this month's competition, and you could win one of ART VPS's incredible brand-new 16-processor PCIx raytrace rendering cards – worth nearly £3,000!

From its inception, the ART VPS PURE render card has proved itself exceptional as the only add-in board to offer dedicated 3D final-frame rendering. And now you have the chance to be one of the first 3D artists to experience the card's new 66MHz compatibility. The winner of this month's competition will receive a new PURE PCIx card, which contains no less than 16 AR350 raytracing processors, doubling the power of the previous card.

PURE is like having a render farm inside your workstation, accelerating rendering speeds as well as extending the features of your system. Its 16 processors produce images that are similar to a high-quality photograph, but with all the benefits of realistic 3D effects and animation. ART VPS's ray-tracing technology enables images to be generated up to 35 times faster than software.

Each card comes with plug-in interfaces for multiple versions of *3ds Max*, *VIZ* and *Maya*. Also included is the RenderCoat library of advanced, physically based materials, such as metallic paint and coated glass, while additional tools provide an intuitive method of simulating both simple and complex lighting.

Other key features include ray tracing, radiosity, HDRI, motion blur and depth of field, along with plug-and-play capabilities and support for both Windows and Mac OS X. Additional *RenderMan* shaders are included, and with a fast full-screen preview for easy set-up, you'll be rendering in minutes rather than hours.

ART VPS technology is used by some of the world's leading design and manufacturing companies, including Learjet, Nikon and Procter & Gamble; architectural firms such as Skidmore, Owings & Merrill, and Chapman Taylor Partners; entertainment companies such as IBM Interactive and Walt Disney Imagineering; and digital post-production studios such as Saddington & Baynes and Burrows.

To stand a chance of winning this fantastic card, simply answer the following question correctly and complete the tie-breaker:

QUESTION

How many AR350 processors does the PURE PCIx render card include?
a) **None**
b) **8**
c) **16**

● The PURE card acts like a built-in render farm inside your computer. No matter how extreme or ambitious your scene might be, its 16 AR350 raytracing processors will render it in a fraction of the usual time

TIE-BREAKER

"If I won the PURE PCIx render card, I'd use it to render…" **(complete in no more than 20 words)**

Email your entry to **3dw.competition@futurenet.co.uk**, putting the words 'Render card competition' in the subject line and including your full name and address. The sender of the best entry received before 21 September 2005 will win a 16-processor PCIx render card. For more infromation about the card itself, or to download plug-ins and sample scenes, visit the ART VPS website: **www.artvps.com**.

● Blue is beautiful: a mix of dedicated hardware and software plug-ins combine to produce the PURE card's raw rendering speed

● Creating photorealistic materials requires a 3D artist to accurately simulate the way light behaves upon striking a real surface. Do this wrongly, and the result can be implausibly reflective, as this test render indicates...

Material world

Turn synthetic-looking surfaces into the stuff that dreams are made of with our expert tips for creating, lighting and rendering truly photorealistic CG materials

Our experts this issue...

Bruce Steele
Bruce is a founder member of UK digital animation studio Glassworks, where he is Director of VFX and Head of Special Projects
[w] www.glassworks.co.uk

Jordi Bares
Jordi has worked at Jim Henson's Creature Shop, Passion Pictures and The Mill. He was Emmy-nominated for his work on the BBC documentary *Pyramid*
[w] www.mill.co.uk

Andy Boyd
Andy Boyd is Head of 3D Commercials at Framestore CFC, where his recent work includes the Chemical Brothers' eye-catching new 'Believe' promo
[w] www.framestore-cfc.com

reating materials in 3D has always been a cheat as reality is just too damned complex to simulate for real. However, over the years, new approaches to rendering have at least extended the capabilities of 3D software to mimic real-world objects.

In the beginning, all CG artists had at their disposal were Lambert, Phong and Blinn shaders. These rely on very simplified tricks for simulating the way in which light behaves when it strikes a surface. In fact, the latter two effectively just compute a Lambert surface, then stick on a highlight - the smaller the highlight, the shinier the surface will look. In 3D, we deal with highlights and reflections differently, but they are the same thing: a highlight is just a very bright reflection.

This brings up an important point - it's impossible to talk about how materials should behave without also talking about lighting. In the real world, countless billions of photons bounce around the environment, only a few of which actually end up at our eyes. All these extra photons contribute to what we call radiosity or Global Illumination, creating soft shadows and

complex interdependencies of bounced light between surfaces. In CG, there are various methods for calculating this bounced light, all offering much-improved shadows and lighting. However, as soon as the camera moves, the simplified radiosity calculation gives a different result for each frame, causing flicker. All you can do is increase the samples, or find another cheat - like freezing the Illumination map, or using the *Dirtmap* shader in *mental ray*.

Over the next four pages, we'll be examining some of those cheats. Our panel of experts will be revealing some of the ways in which CG professionals work around the limitations of their software in order to create better materials and lighting set-ups. Some of the tips will be general, while others will relate to particular types of material, such as glass or painted metal. Similarly, some will be specific to individual applications, while others apply equally to any 3D software package.

The result is a collection of tips and tricks for creating CG imagery that can be dropped into real footage without anyone being able to spot where one ends and the other begins.

● A simple *Maya* shader network that creates a 'soft' look suitable for photorealistic renders of cloth and similar materials

THE BRAIN CAN PLAY TRICKS ON US, QUICKLY BECOMING ACCLIMATISED TO THE LOOK OF A RENDER – EVEN IF THAT LOOK IS WRONG

the Incandescence or the Ambient of a shader. Using the surfaceLuminance node is very useful for creating shaders that react differently when illuminated, such as simulating roadside reflectors that light up at night when car headlights shine upon them. **[AB]**

CHANGE YOUR ENVIRONMENT
Any software package
The brain can play tricks on us, quickly becoming acclimatised to the look of a render – even if that look is wrong. Try to take regular breaks from the screen and when you return to your computer, you will suddenly see problems that were not apparent before. Similarly, always move the camera, the object, and the lighting in order to see how materials react to different conditions. Suddenly, patterns that would otherwise not be noticeable, such as Bump mapping artifacts, will become obvious. **[JB]**

DON'T BE AFRAID TO CHEAT
Any software package
Computer graphics, even when trying to mimic reality, rely on enhanced reality. Our peers in the film industry light and set up materials in special ways to make them look more interesting - and so should you. A good CG lighting set-up will end up including 'tools' like flags, banners and fake reflections in order to make the scene more interesting. **[JB]**

EVALUATING MATERIALS
Any software package
Good working practices are essential when gauging renders for real-world accuracy. Evaluate the materials you create in known conditions, using a standard lighting set-up, before placing them in the final scene. Then re-evaluate them in that context, tweaking the necessary settings on a shot-by-shot basis. The human eye assesses the realism of a surface by comparing it to objects around it. There is nothing worse than evaluating a render against a black background. **[JB]**

USE REFERENCE IMAGERY
Any software package
Always work from photographic reference material – an obvious, but fundamental, point. Collect similar objects to the one you have to texture, and photograph them in different lighting conditions. But remember, you only have to build your object for a single shot, not for every possible situation in the real world. Take your reference photos in

conditions as similar as possible to the ones you will eventually have to recreate. **[JB]**

SOFTER RENDER EFFECTS
Maya
To create a 'soft' look that often works well for cloth and similar materials, create a Facing Ratios set-up (by plugging the samplerInfo node into the uCoord of a ramp) and Multiply it with a surfaceLuminance node. Connect this to

● Avoid evaluating renders solely against black backgrounds. Always judge the realism of a surface in the context of a shot

MAYA | Better Displacement

I love using Displacement in renders. Unfortunately, *Maya*'s renderer doesn't. However, given the right settings, it is possible to achieve good results. First, always use a Bump map for the fine surface detail of an object: only use displacement just where you really need it. Second, you may need to adjust the Feature Displacement settings to refine the look you are trying to achieve. Refer to *Maya*'s supporting documentation for a detailed explanation, but be careful - it doesn't take much tweaking to bring your machine to its knees! To help with memory usage, make use of the automatic Calculate Bounding Box Scale under the Feature Displacement settings. **[AB]**

● Used judiciously, Displacement can really improve the look of a render. The images above show (from left to right), the Bump, Displacement and Colour textures used to render the image above

A GOOD LIGHTING SET-UP SHOULD MATCH THE LIGHTING RATIOS OF THE REAL WORLD

FAKE HDR REFLECTIONS
Maya

To get a fake High Dynamic Range effect without having to render with HDR, add several images together in the Hypergraph using the plusMinusAverage node. I normally add together several images taken of the environment at different exposure settings. Because the plusMinusAverage node adds the images in floating-point style, the individual 8-bit images add up to create something similar to a HDR image. I then add the lowest-exposure image in a few more times to get more contrast in the reflections. [AB]

### SETTING UP LIGHTING
Any software package

Obviously, the directions of the shadows in the CG elements of a shot should match those of the surroundings. If you can afford one, use a reflection probe you can check easily where the lights really were. A good lighting set-up should also match the lighting ratios of the real environment. Analyse the strength of each light as if they were separated and evaluate their intensities in relation to one another. [JB]

ONE LIGHT, ONE PURPOSE
Softimage|XSI

Don't try to achieve two things with a single light – it almost always creates more work in the long run. In particular, avoid using the Inclusive/Exclusive setting unless you really have
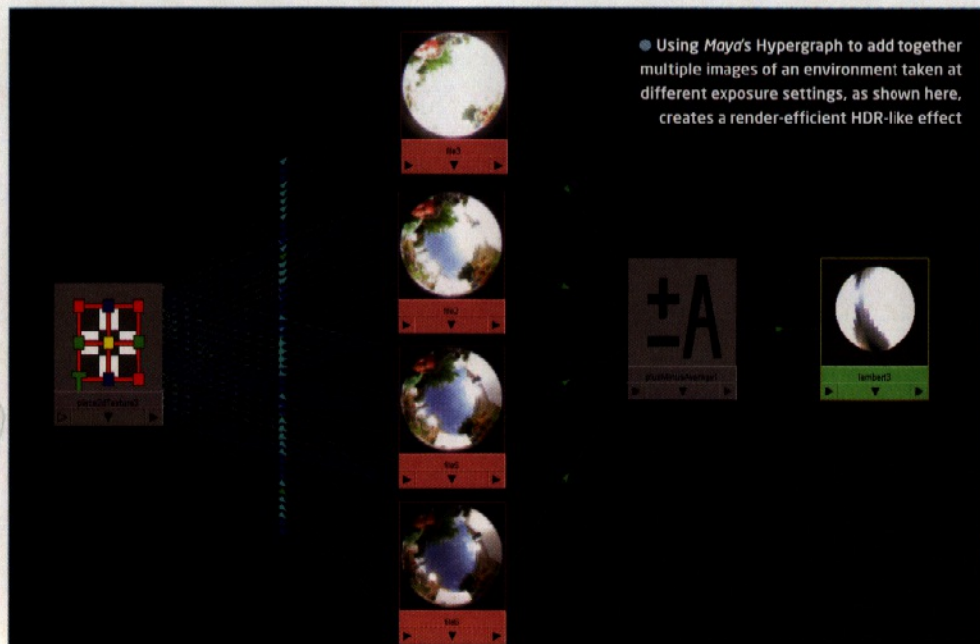
to, since this is usually a recipe for disaster when maintaining scenes. If you want to cheat a lot, divide specular and diffuse into separate lights, but keep them linked by name so you remember that they function as a single unit. [JB]

DEBUGGING LIGHTS
Any software package

To speed up the process of placing a new light in a scene with many existing lights, set its colour to bright red so that you can see its influence more clearly. Once you are happy with its position, set the colour and intensity correctly. The more

complex a scene gets, the more you are also going to need to turn off ALL the lights except the one you are evaluating, tweak it individually, then turn them all on again. [JB]

MINIMISE AMBIENT LIGHTING
Any software package

If you really know what you're doing, ambient lighting can be a useful tool to lift certain shadows – but as a rule of thumb, avoid it, or help it along with directional lights in order to add some variance to the flat pattern this type of lighting always creates. [JB]

BETTER NON-METALS
Any software package

A common error when rendering non-metals (or 'dielectrics') is to pump the reflectance of the surface too high. Two of the important characteristics of non-metallic materials are that their highlights are always white (or the colour of your light) – not the colour of the diffuse component - and that the specular component is always around 4% or less: no more than 4% of the light should be reflected. [JB]

● Using *Maya*'s Hypergraph to add together multiple images of an environment taken at different exposure settings, as shown here, creates a render-efficient HDR-like effect

XSI | Rendering glass windows

Although 3D software has been able to simulate refractive materials, like water or glass, for a long time, the way in which it does so is often only a simplified version of what happens in reality. Light travels at different speeds through materials with different optical densities, causing it to bend when it meets the boundary between two such materials: for example, glass and air. In most 3D software, light is refracted at a constant angle, regardless of its colour. However, in reality, blue light gets refracted much more than red – a phenomenon known as chromatic aberration.

At a certain angle to the surface, light will also suddenly switch from being refracted to being reflected. This is called total internal reflection and, again, is usually ignored in simple CG glass materials. Finally, refractive objects can also focus light into bright highlights on surrounding surfaces, or 'caustics'. While you can often get away with ignoring caustics and chromatic aberration, it is important to at least fake total internal reflection, even for simple glass objects like windows.

Using the trick shown in the boxout on the page opposite (a Dielectric node combined with a Colour Correct node to increase contrast), you will be able to fake total internal reflection effects on simple glass objects.

The minimum reflection (back along the normal) should be around 8%. In reality, there would be no maximum value – after all, you can always have more photons - but in *XSI*, the maximum is 100% reflection, so you need to colour-correct the reflection to burn out in a realistic way.

Note that windows that are coated in metallic films may have increased or decreased reflectivity. Some behave more like mirrors than plain glass. [BS]

● The reflectivity of glass varies with angle of incidence: an effect it is important to fake in 3D
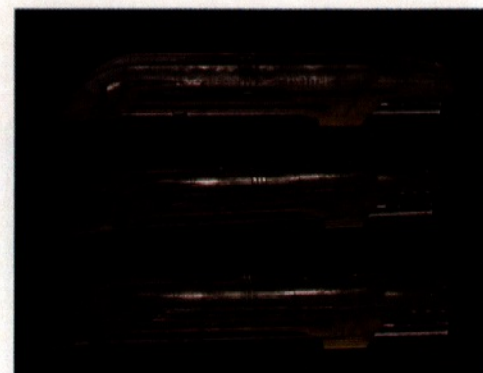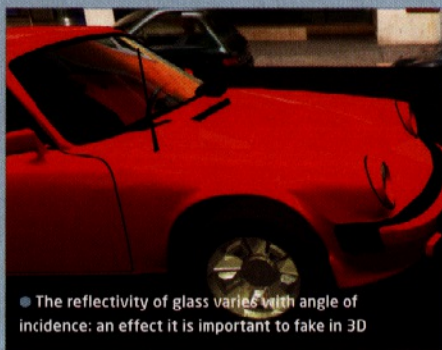
● Real highlights often have unusual shapes. Pay attention to the streaks of light that appear along a curved surface

● HDR becomes an even more powerful tool for generating photorealistic renders when combined with occlusion. These two techniques were used to render the image above

A VITAL TIP: ALWAYS MATCH THE BLACK AND WHITE LEVELS OF YOUR RENDER TO THOSE OF YOUR FILM STOCK

BETTER METALS
Any software package

Metals (including mirrored surfaces) are different from non-metals in the sense that their highlights are the colour of the material itself (the diffuse component), and that their reflectivity is much higher. Therefore, to get them looking good, you'll also need to give them something interesting to reflect. Remember that reflections are not always crisp: some are blurry or become so according to the distance of the object from the surface in which it's reflected. Try to mimic this, either in your 3D package, or in post. **[JB]**

SPECIAL HIGHLIGHTS
Any software package

In real life, highlights have very interesting shapes, which 3D software doesn't always recreate very effectively. Try to use reflections as highlights to get the shapes you need. Just think of those nice white stripes that you often see in car magazines. **[JB]**

USE GRAIN
Photoshop

Always put a little noise or grain in your source images if they are a solid colour, such as flat artwork. I normally use Filter > Noise in *Photoshop* or add grain in *Shake*. A little noise will help most rendered images look more photographic. **[AB]**

MATCH THE LEVELS
Any software package

One of the most – if not *the* most – important things to remember is to match the black and white levels of your render to those of your film stock (or of the footage into which your CG work will be inserted). Your blacks should never be darker than the darkest of the blacks in the footage, and your white should also be equal or lower in brightness to the brightest of the whites. **[JB]**

XSI | Rendering realistic painted metal

Creating a shiny painted surface like that of a car is something that visual effects artists are asked to do fairly often. However, you may be surprised to learn that although *Maya* deals with coloured reflections correctly, *XSI* does exactly the wrong thing! Setting the reflective colour to red in *XSI* is like putting a red filter over a chrome object - great for Christmas baubles and not much else! Reflections and highlights should be combined with a Screen function, not a Mix: the highlights shouldn't fade as you increase the reflections.

But don't despair - at least you can fix this using the Render Tree. Although I'll explain this process specifically for *XSI*, these techniques will work in any 3D package in which you can define a shader. (Note: the Screen function works as follows. Invert input A, Invert input B, Multiply A by B and Invert the result. It's kind of the opposite of Multiply: things will always get brighter, not darker.)

To do this, create a default Phong material for your object and edit it in the Render Tree. Create a second Phong node and a Mixer. Connect the two Phong nodes to the Mixer and the Mixer to the material inputs. Edit the top Phong node and turn Reflections off. Now edit the second Phong node and turn off Ambient, Diffuse and Highlight while turning on Reflections at 100%. Change the Mixer to use Screen to combine the reflections with the surface colour. Any black reflections will now take on the colour of the car. The advantage of setting up the material in this way is that the reflections are not themselves coloured, but are scaled by the surface colour - so if the car is two-tone, they will still display correctly. Many shiny surfaces reflect much more strongly at an oblique angle than they do straight on and this is something that can really help to make your renders look more realistic.

Using a Dielectric node (brightness by surface angle) and a Colour Correct node, you can create a kind of holdback matte which, when multiplied by the reflection, will let you adjust the reflectivity of the surface by angle. The resulting render tree is shown in the screenshot below. Unless you're using HDRI, it might also help to colour-correct the reflections themselves to increase contrast and produce burned-out highlights.

This method can also be used to create colour changes according to the angle of a surface to the viewer. This can be used subtly, to add a pleasing complexity to a surface colour, or whacked right up to produce a two-tone paint effect. **[BS]**
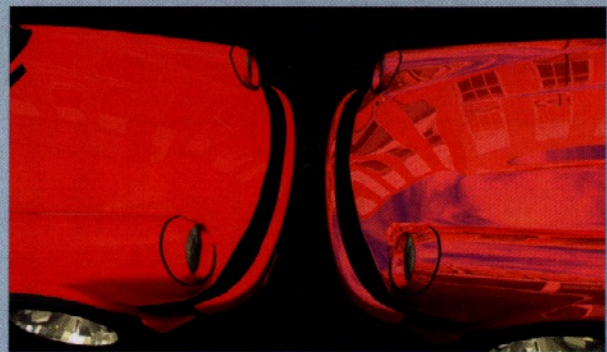
● Two rendered cars: one with the incorrect 'Christmas bauble' effect described in the text, and the other with correct additive reflections. If you can't tell which is which, you'd probably better start looking for another job!

This is the Render Tree for additive reflections
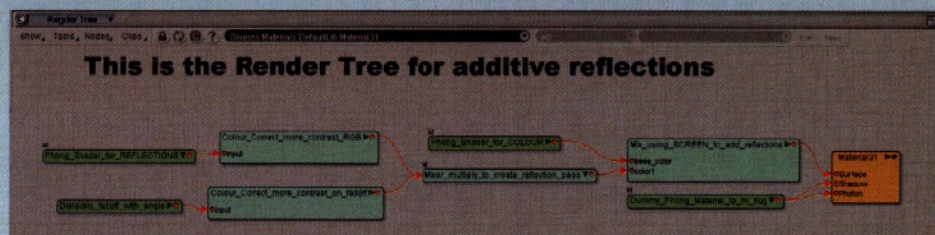
● A better set-up for simulating painted metal in XSI. Simply setting the reflective colour to the surface colour of the material will result in an unattractive over-reflective effect. For more details, a full-sized version of this image can be found on the CD

OCCLUSION PASSES
Shake

Occlusion is so over-used these days, but does make a big difference to the look of your renders. I usually render out an Occlusion pass - a separate render pass showing the extent to which ambient light is blocked from reaching a particular point on a surface by surrounding geometry - and composite it in *Shake* by Multiplying it over the image. At Framestore CFC, we generate our Occlusion passes using Daniel Rind's Dirtmap plug-in for mental ray (freely downloadable from http://animus.brinkster.net). Most occlusion shaders have a Min and a Max value. To help speed up renders, try reducing the Max fall off according to the scale of your scene. I normally use a value of one. **[AB]** ●
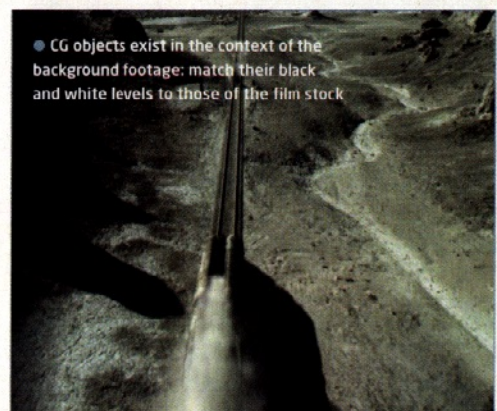
● CG objects exist in the context of the background footage: match their black and white levels to those of the film stock

ON THE CD
● *Vue 5 Infinite*
exclusive demo
and project files
PAGE 114

VUE 5 INFINITE

Jungle fever

Create the kind of sprawling, intricately detailed jungle terrain that even Madagascar's creators would be proud of, with the help of the exclusive new trial version of Vue 5 Infinite on the CD   BY ERAN DINUR

FACTFILE

FOR
Vue 5 Infinite

DIFFICULTY
Intermediate

TIME TAKEN
Two hours

ON THE CD
• Startup, intermediate and final scene files
• Rock texture
• Full-size screenshots

ALSO REQUIRED
N/A

When you think of a jungle, the first things that come to mind are trees. Lots of trees. But there aren't many sane people out there who'd be willing to sit down and manually place each of the million or so 3D trees that make up this scene. And this is where *Vue 5 Infinite* comes in.

This application from e-on Software creates and animates natural 3D scenery. Like its predecessor, *Vue 4 Pro*, this recently released version offers an extensive set of integration, compositing and synchronisation tools specifically geared toward the professional user. This increased flexibility makes *Vue 5 Infinite* especially attractive for animators, architects, matte painters and visualisation artists who need to add detailed and realistic natural 3D environments to their productions.

Vue 5 Infinite is packed full with new features. Highlights include a newly designed render engine with GI, radiosity and image-based lighting, deep-level shader customisation, SmartGraph function editor, procedural terrains with infinite level of detail and a full-featured multi-pass renderer with *Photoshop* export.

But back to those trees. With the help of *Vue 5 Infinite's* indispensable EcoSystems feature (an object duplication and placement system), this gargantuan task is diminished to no more than a few mouse clicks. Moreover, as you progress through the tutorial, you'll notice the polygon count grows at an alarming rate (the final scene contains around 3 billion polygons). While most 3D programs will slow down to a crawl trying to cope with such a high poly count, *Vue 5 Infinite* happily goes about its business.

In addition to working with EcoSystems, you'll also create and edit procedural terrains, fine-tune the atmosphere, work out the lighting, do some texturing and even get a feel of the new function graph editor. If you've worked with other versions of *Vue*, you'll find your way easily in this walkthrough. If not then you might want to do the kick-start tutorial (in the Help section of the demo) first.

Eran Dinur is a freelance 3D artist, musician and animator. He's created many of the sample scenes for *Vue 3*, *Vue 4*, *Vue 4 Pro*, *Vue 5 Esprit* and *Vue 5 Infinite*
[w] www.e-onsoftware.com

STAGE ONE | Getting to know the interface
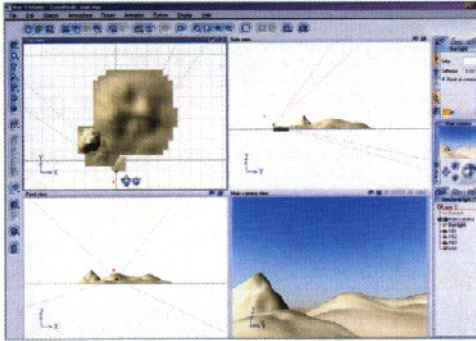
01 Start off by opening CerroVerde_start.vue from the CD. The scene uses a simple clear-day atmosphere, and contains four lo-res terrain objects. These terrains will be completely covered with jungle later on. If you wish, you can double click on any display window's title bar to switch to Single View mode. Double click once more to return to Four View mode.

02 Have a look at the right side of the interface. The World browser lists all the objects in the scene. Although you can select objects directly within the view panels, it's usually easier to use the World browser, especially with crowded scenes. Click an object twice to rename it. At any point throughout the tutorial, you can do a quick test-render by pressing [F9].

03 The Object Properties panel (at the top right corner) has three tabs. The Aspect tab gives you access to various parameters, depending on the type of object you select. The Numerics tab lets you input precise values for position, orientat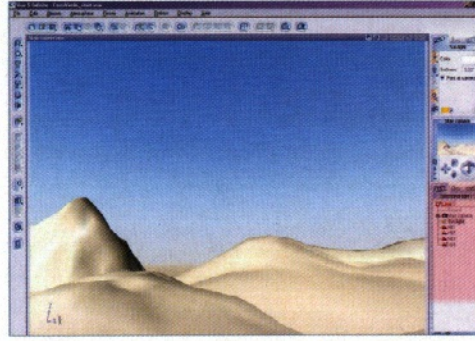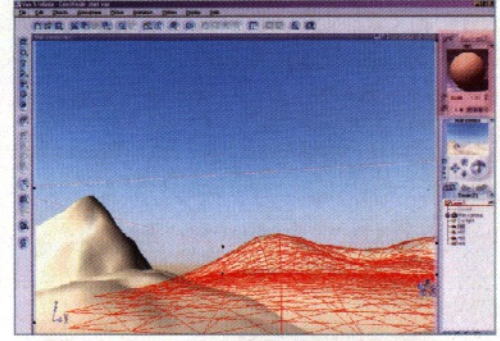ion and size. Of course, you can freely transform objects directly within the view panels, but in this tutorial you'll probably find it easier to use the Numerics tab.

STAGE TWO | Creating the mountains with procedural terrains

**04** Unlike the lower hills, the steep mountains will be only partially covered with vegetation, so a lot of exposed rock will be visible. To create a detailed surface, you'll use procedural terrains. Right click the Terrain button and choose Procedural terrain. Rename the newly created terrain 'Mountain1'. Rescale it to a much larger size (X, Y=563, Z=398.5) and position it at X=-295.5, Y=518.7.

05 If you test render the scene now, you'll notice that the mountain looks a bit too smooth. You can add some roughness by modifying the Procedural noise that controls the terrain. Select Mountain1 and press [Ctrl]+[E] to open the Terrain Editor. Switch to the Proc tab, right click on the Altitude Production swatch and choose Edit function. This opens the Function Graph Editor.
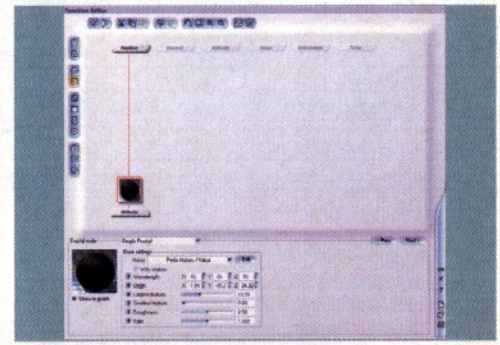
06 Click on the Noise Function swatch to unfold its parameters. Change the Wavelength for X, Y and Z to 0.45. Change the origin to X=-1.84, Y=-45.2, Z=24.32. By reducing the wavelength you get smaller variations in the noise, which results in a rougher terrain. Click OK twice to close the Editors and then test render the scene again to see the difference.
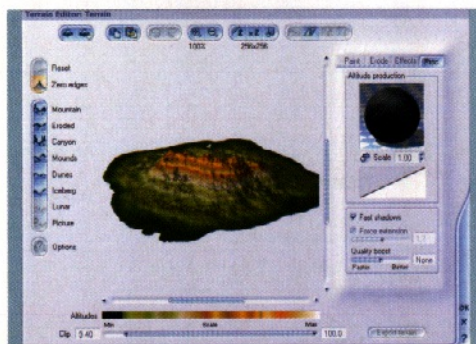
07 To create a dramatic, imposing look, rotate the terrain diagonally. First, move it up on the Z axis to 228.8 (so that it's virtually up in the air). Now set the Pitch to 40.35 and Roll to 44.1. You will need to get rid of the unwanted flat edges around the mountain. To do this, open the Terrain Editor and move the Altitudes clip slider's minimum value to around 9.4.
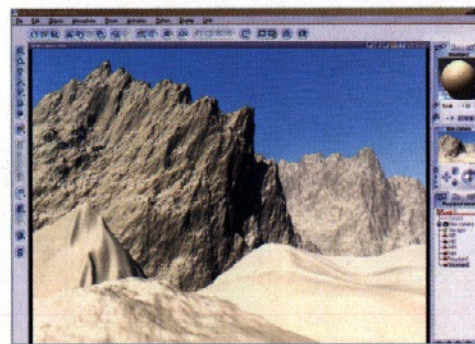
08 Press [Ctrl]+[D] to duplicate the terrain and rename the duplicated terrain 'Mountain2'. Resize it to X, Y=744, Z=526.5, move it to X=276, Y=1137, Z=197 and change its orientation to Pitch=26.28, Yaw=360, Roll=1.6. Although this is an exact copy of the first mountain, the new orientation and size values make it look different.

EXPERT TIP

Create sprawling 'scapes
In this tutorial, each Procedural terrain is used to create a single mountain. However, you can easily use one Procedural terrain object to create a complete landscape by turning off the Zero Edges button in the Terrain Editor. You can stretch the terrain to virtually any size, without ever worrying about lack of detail or ugly polygon edges. Since Procedural terrains are based on noise functions, you can produce a great variety of landscapes. Start off by experimenting with different Roughness and Gain values before exploring the huge variety of noises in the Function Graph Editor.

STAGE THREE | Creating the jungle with EcoSystems

09 At this point, you can load CerroVerde_terrains.vue from the CD to continue. Before creating the EcoSystem for Mountain1, you'll apply an underlying rock Texture map to it. Select Mountain1 and, in the Aspect tab, double click on the material swatch to open the Material Editor. In the Colours tab, select Mapped mode.
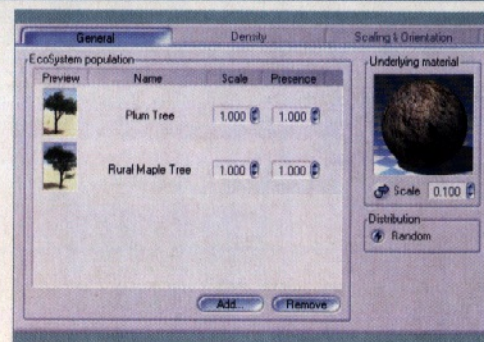

10 Double click on the empty Picture swatch to open the bitmap browser. Click the Browse File button at the bottom of the browser and load the image file CerroVerde_rock.jpg from the CD. Now change the material type from Simple material to EcoSystem. The appearance of the Editor changes and the rock texture now becomes an underlying material. Change its scale to 0.1.


11 In the Ecosystem Population list, click Add, and choose Plant. Select the Plum tree from the Plant browser and click OK. Repeat this step to add a Rural Maple tree. Switch to the Density tab, set overall density to 88%, sampling quality to 100%, and uncheck Decay near foreign objects (this allows population even in areas where the terrain intersects other objects).
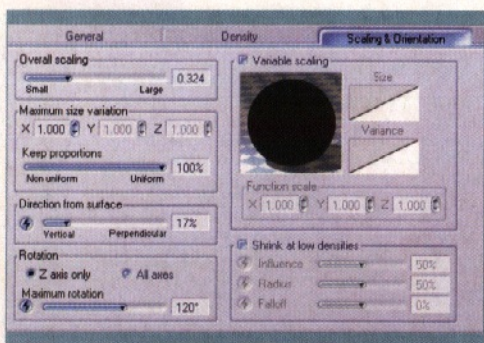
12 Switch to the Scaling & Orientation tab. Change the overall scaling to 0.324 (to get the right proportion between the mountain and the trees) and set the Direction from Surface to 17%. Click OK and test render the scene. Notice how, just like in nature, the trees are smartly scattered only in places were they'll grow strong and not fall down (for example on very steep slopes).
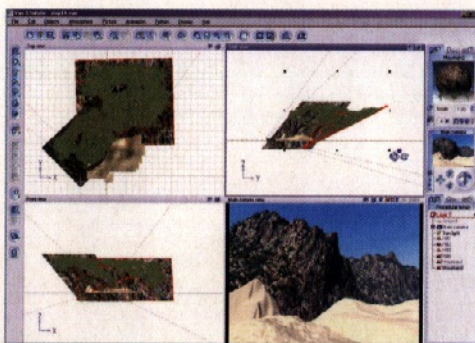
13 Since EcoSystems behave just like regular materials, you can drag and drop them from one object to another - so select Mountain1 and drag its Material swatch over to Mountain2 in the World browser. We still need to initiate the scattering calculation for Mountain2, though, so open its Material Editor, click on the Populate button, and then close it back.
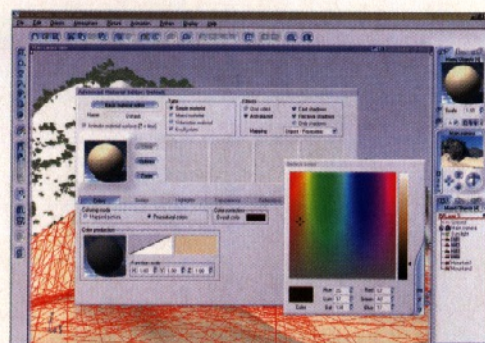
14 Hold [Ctrl] and select all four hills. Open the Material Editor, double click on the Colour Correction swatch and choose a dark brown colour. As the hills will be completely covered with vegetation, a flat single Colour material will do. Click on OK twice to close the Editors. Now select Hill1 only. Open its Material editor and change the material to EcoSystem.
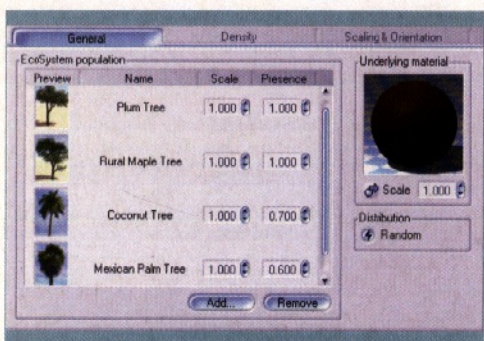
15 This time, add four types of trees: Plum, Rural Maple, Coconut and Mexican palm. In the population list, change the presence value to 0.7 for the Coconut and 0.6 for the Palm. This reduces their relative presence in the EcoSystem. Set overall density to 80%, uncheck Decay near foreign objects and change overall scaling to 0.338. Click Populate and click on OK.
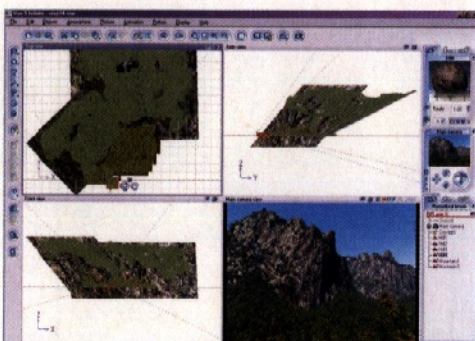
16 Copy the Ecosystem from Hill1 over to Hill2 and Hill3. Select Hill3 and open its Material editor. In the Population list, select the Coconut and Palm trees and click Remove. Change the Overall density to 98%. Now drag and drop the EcoSystem from Mountain1 over to Hill4. Open the Hill4 Material Editor and add a Coconut tree with a 0.7 presence value. Populate hills 2-4 in turn and test render.

EXPERT TIP

Peak performance

At this point you're running a scene that contains 2.7-3 billion polygons, yet *Vue* should still perform well on most systems. To speed things up further, try one of the following:
1) Select all the terrains and, in the bottom left corner of the Aspect tab, click the Preview options button and choose Wireframe box. 2) Right click on the small camera Preview window and disable auto-update.
3) Go to File > Options > Display options and decrease instant and background draw speeds. 4) Go to File > Options > General Preferences and check Disable Automatic Material Preview Rendering.

STAGE FOUR | Creating the atmosphere and lighting
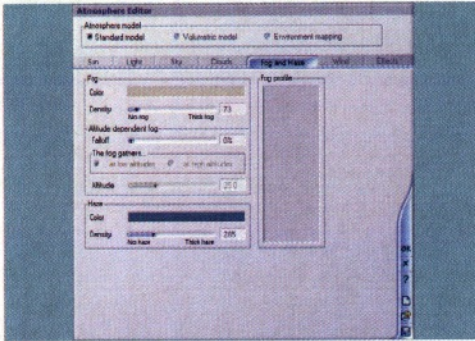
17 Press [F4] to open the Atmosphere Editor. For a deeper blue sky colour, select the Sky tab, double click on the Colour map and choose the New Orleans Blue gradient from the Daytime skies category. Switch to the Fog and Haze tab. Set Fog density to 73 and Haze density to 285. This adds just enough fog and haze to give depth to the image, without washing it out.
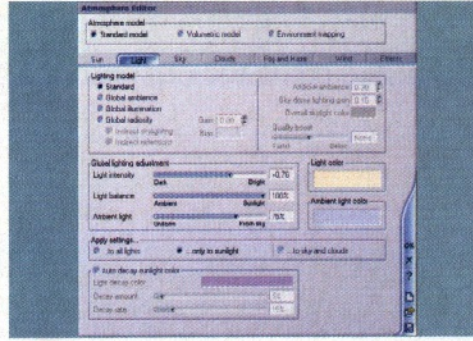
18 Double click on the haze colour swatch and change it to R=100, G=137, B=168. Switch to the Light tab. Raise the Light intensity to 0.76 and set the Light balance to 100% sunlight. Change Light colour to R=255, G=243, B =231. Switch to the Sun tab and set Azimuth to 131, Pitch to 36.84. This places the sun lower in the sky, to the right of the camera.
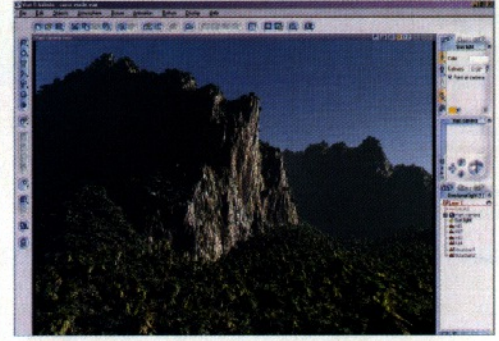
19 Test render the scene. The brighter light and lower sunlight angle add more contrast, which nicely emphasises details in the jungle growth. However, anything hidden from the sunlight is completely dark. *Vue 5 Infinite's* Global Illumination can produce extremely realistic ambient light, but for such a heavily populated scene, two fill lights with soft shadows will do a pretty good job.
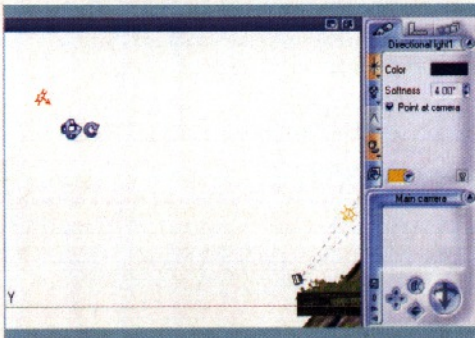
20 Right click the Create Light button (left toolbar) and choose Directional light. Place it at X=-289, Y=-491, Z=312.5. In the Aspect tab, double click on the light's Colour swatch and set it to dark gray-blue (R=64, G=63, B=86). The dark colour effectively reduces the light's intensity. Now set the Softness to 4.
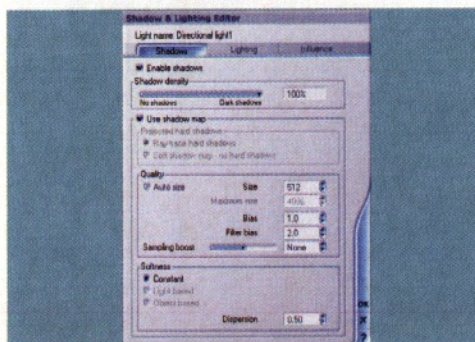
21 Still in the Aspect tab, click the Light Options button (second from the bottom). This opens the Shadow and Lighting Editor. In the Shadows tab, check Use Shadow Map. Click OK to close the Editor. Duplicate the light [Ctrl]+[D] and place the duplicated light lower and to the left of the first one. The correct co-ordinates are X=-678, Y=-284.6, Z=227.

22 For a final high-quality render, Press [Ctrl]+[F9] to open the Rendering Options dialogue, select the Broadcast Preset Quality setting (use the faster Final preset for large print-size resolutions), choose Render to screen, set your desired image resolution, and click Render. As a final touch, I've added some low-lying fog patches, using groups of alpha planes. Although this is

beyond the scope of this tutorial, you can get an idea of how it was done by examining CerroVerde_Final.vue. This tutorial only skims the surface of *Vue 5 Infinite*. There are many other features that need a tutorial of their own (such as indirect and image-based lighting, shader customisation and plant editing, to name just a few), so take the time to explore these features. ●

VUE 5 INFINITE FOR LESS

Once you've tried the demo version on the CD, take advantage of this exclusive 3D World offer and you'll save £70 ($100) on the regular price when ordering the full version of Vue 5 Infinite

Specifically designed for professionals, and combining a multitude of cutting-edge features that easily integrate with your workflow, *Vue 5 Infinite* is e-on software's high-end 3D scenery solution for illustrators, VFX studios, architects, and 3D computer graphics professionals. It is strongly focused on power, productivity and interoperability with existing toolkits.

Vue 5 Infinite is one of the most efficient and advanced solution for creating, animating and rendering natural 3D environments. The package naturally integrates and extends all major 3D applications to provide a complete, professional natural 3D studio. With its intuitive, production-oriented layout, users will quickly create and enhance their projects with rich EcoSystems of wind-swept trees and plants, volumetric atmospheres and detailed terrains in fully animated scenes, rendered in professional and photorealistic quality with Global Lighting, Radiosity and HDRI.

With *Vue 5 Infinite*, great emphasis has been placed on creating a flexible and extensive toolset that allows you to combine *Vue*'s natural scenery creation assets with other 3D and 2D applications.

In particular, the software features a set of synchronisation plug-ins to ensure perfect matching of camera motion, focal length and lighting. For example, you could use your favourite 3D program to create and render a character animation, then create a synchronised background animation in *Vue*, and finally composite the two sequences together using *Vue 5 Infinite*'s G-Buffer or multi-pass rendering! Synchronisation plug-ins are available for *Maya*, *3ds Max*, *Cinema 4D*, *LightWave* and *Softimage|XSI*.

Whether you do character animation or architectural visualisation, compositing or post-processing, you'll quickly discover how easily *Vue 5 Infinite* can fit in to your work. To discover why the software is used in so many CG studios around the world, just install the trial version from this issue's CD, and check out Eran Dinur's introductory tutorial, which starts on page 58.

And after you've seen what *Vue 5 Infinite* is capable of, you can buy the complete product and save £70 on the regular price! Just quote the special *3D World* code when ordering, and receive this top-notch 3D app for less! For details of how to claim your exclusive *3D World* reader discount, follow the instructions below.

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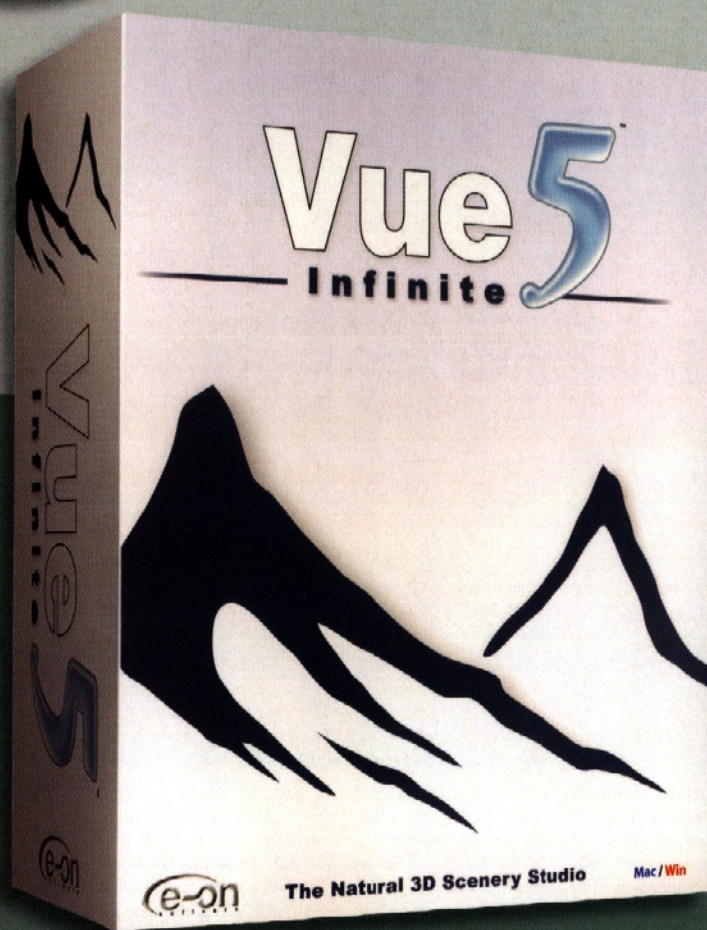
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ANIMAL MAGIC

Forget photorealism. Good old cartoon slapstick is back in *Madagascar:* the bendiest, squishiest CGI movie yet, courtesy of DreamWorks. Creating a classic animated style is harder than it looks

BY MARK RAMSHAW

E ver the enthusiast, Jeffrey Katzenberg has declared *Madagascar* his favourite animated movie ever, proclaiming it to be the first 3D movie to successfully utilise squash and stretch. Although the former part of the statement may be mere hyberbole, he's certainly not exaggerating about the DreamWorks animators' ability to tie the film's cast of characters in knots, bend them right out of shape, and quite literally send jaws crashing to the floor. This is what happens when cutting-edge computer animation meets old-school visual humour. Fans of slapstick have never had it so good.

Eric Darnell, who directs alongside Tom McGrath, suggests that the move to a more cartoonish kind of CG is a logical progression. "In part it's because computers are much more powerful, but more

"IT'S GREAT TO INCORPORATE THE STYLE OF THE WARNER BROTHERS CARTOONS INTO WHAT WE DO – TO COMBINE THE BEST OF THE OLD AND THE NEW"
ERIC DARNELL, DIRECTOR

important is the fact that people in this industry have got better at what they do. And of course there's also the additional leverage provided by the many animators with traditional skills making the transition to the digital."

Darnell, who was last in the director's chair for 1998's *Antz*, had originally been developing *Rockumentary*, pitched as 'A Hard Day's Night', but with penguins'. McGrath was sufficiently intrigued by the concept to sign up with DreamWorks. "The very day he started the project was shelved," recalls Darnell. "So we went back into development, and eventually this script came up."

The renowned Craig Kellman was lead character designer. Of his original concept art a series of very graphic, angular designs proved

● Alex the lion, Gloria the hippo, Melman the giraffe, Marty the zebra and an awful lot of lemurs all benefit from the traditional squash-and-stretch style of DreamWorks' *Madagascar*.

● "Melman the Giraffe has a lot of joints that separate," says Lead Character Technical Director Milana Huang. "The head can move independently of the shoulders, for example. And we spent a lot of time perfecting a spine system that could easily adjust and produce nice silhouettes."

● *Madagascar* was developed across two DreamWorks facilities. "We have a room where one wall is a high definition image," says Co-director Eric Darnell. "It's the next best thing to being in both places at once."

resoundingly popular, setting in motion development of the new technologies required to bring them to life. Some may consider the graphic style chosen (and the investment required to make it workable) something of a risky move, but Darnell doesn't see it that way: "I think everybody loves this kind of animation... or at least I do," he laughs. "I still adore the work of Tex Avery, Chuck Jones, and Bob Clampett. Of course there's a reason why those Warners cartoons were only seven minutes long. You can't rely on slapstick for an 80 minute film. The big challenge was to complement the funny animation with characters and story that possess depth."

That story mines new comedy from a familiar fish out of water premise, with a series of events that sees four animals from New York

"IT SEEMED AN APPROPRIATE WAY OF STORYTELLING, PUSHING THE VISUALS TO THE EXTREME TO HEIGHTEN THE COMEDY"
ERIC DARNELL, DIRECTOR

Central Park Zoo – Melman the Giraffe, Marty the Zebra, Alex the Lion, and Gloria the Hippo – washed ashore on the island of Madagascar. Culture shock, confrontation with their animal instincts, and encounters with the island's indigenous population of lemurs give the animators ample opportunities to put the squashable, stretchable rigs through the paces: "The squash and stretch style places more responsibility on the animators," says Darnell. "They're no longer able to duplicate what they see every day. They might be able to try out a movement in the mirror, but then they have to work to exaggerate it heavily. The animators loved the challenge, though. Caricaturing what we see in the real world is what they're trained to do, after all."

OUT OF THEIR TREE

The decision to use such a cartoonish style had a profound effect on the workload for the R&D and Technical Direction departments. Very different rig behaviour would be required, with an emphasis on flexibility rather than anatomical detail, plus a whole new set of controls to give the animators something powerful but intuitive to work with.

"We needed to take our character rig technology to a different level, using methods we'd never even tried before," says Lead Character Technical Director Milana Huang. "And of course we had to deal with the fact that they'd be viewed in 3D, so any squash and stretch had to hold up from all possible angles."

The system that was developed enables animators to focus on internal movement rather than working to preserve the surface form.

● The original script called for a storm to throw the lead characters overboard. Co-director Tom McGrath then realised it would be funnier to resurrect the penguin characters from his *Rockumentary*, and have them cause the crisis

IN FOCUS | How DreamWorks' animators got their zoo loose

01 "In *Shrek 2* much of the face was a solid structure, but here we wanted to do things like pop the eyes out," says Rex Grignon, Head of Character Animation. "Dick Walsh's facial animation system was adapted to deal with more cartoony styles."

02 Gloria the Hippo is voiced by Jada Pinkett Smith. "We used *Maya* for some of the modelling, but the character setup, animation and lighting is all achieved using 'home-made' software," says Grignon. Rendering is courtesy of the same proprietary system that was previously used in *Shrek 2*

03 There were concerns about the effects of squash and stretch on the textures: "We allowed animators to see how characters stretched, so any issues could be resolved," says Lead Character Technical Director, Milana Huang

04 Marty the Zebra can stand erect or choose to roam around on all fours. "We originally thought of him a little like a guy in a zebra suit, but when we tried putting him on all fours, he still looked like a guy," says Huang. "So we had to alter the rig."

05 "Because this is a more cartoony style, we also had to work to define a new way of animating with the rigs," says Huang. "The style requires a lot more pose-to-pose, so we built controls specifically for that."

06 "Gloria was so big, we needed animation controls that would still leave us with a smooth silhouette," says Huang. A system was developed to preserve the volume as animators pushed her into all manner of extreme poses

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They can even effectively disconnect one body part from another, freely altering one section without it impacting on a theoretically connected joint. Automatic skinning then accommodates any squash and stretch achieved, using a carefully placed elastic mesh of points.

"These are stretched across the body, helping to relax the skin to provide a smooth silhouette," says Huang. "The placement of that mesh had to be done by hand, to ensure that each point is at the optimum location. Of course all the main characters have vastly different designs, so we had to go through the same process for each, as well as deal with the different anatomical structure of each animal."

Huang estimates that each lead character has around 800 animation controls on the body, then an additional 300 for the face: "Of course it's cool to throw around numbers like that, but the animators generally work with a more minimal set."

For facial animation, Dick Walsh and his team took the acclaimed system developed for the *Shrek* movies and developed it further to deal with cartoonish structural alterations – in the wonderful world of

Madagascar a creature's muzzle can be pushed to one side, rotated, or elongated to comical lengths: "If you look back at the Tex Avery style of animation there's a delineation point just underneath the eyeballs for the squash and stretch," says Huang. "So Walsh modified it so we can add controls to separately deform both the top and bottom halves of the face. There's now also an extreme range of motion in the frown area, and the corners of the mouth can pretty much drop off the face."

Eyelids were another area given a makeover. In place of lids that attach at the corners, 'shutter eyelids' work freely of one another, enabling the animators to form clean, cartoonish lines. And then there was the 'stunt tongue'. "In past movies the tongues have stayed inside the mouth, and were only really used to helped with phonemes," explains Huang. "But tongues are inherently funny. Using the stunt tongue rig they can hang out, attach to things... Melman even picks his nose with it."

Over in the animation department a team of around 50 worked with these rigs to bring the movie's cast of characters to life. Rather

● The lemurs required versatile rigs to handle both bipedal and quadruped animation. Some scenes feature more than 900 of the critters

● "The squash and stretch isn't just achieved by arbitrary scaling," says Milana Huang. "It's very structured, with scaling relative to the bones underneath and a correlation with the rotation and translation controls."

● "From modeller and character TD work right through to surfacing, everybody was keen to dig their heels in and remain committed to the look for this movie – even though it made everything harder," says Grignon

than assign official character leads, the animators worked in teams of between four and ten on individual sequences.

RUMBLE IN THE JUNGLE

"On this movie we had the luxury of time to create performance tests," says Rex Grignon, Head of Character Animation on the film. "[Being able to do] that really established the animation style and showed how the rigs worked."

Grignon admits that making the leap from *Shrek* and *Shrek 2* to this cartoonish style required some adjustment: "It's not quite as drastic as switching from water colours to oils, but there were a lot of new tools in our kit. And because the character model can be easily broken up, the animator can't rely on the computer to make sure it fits together correctly." Of course, such

● For Rex Grignon, Head of Character Animation, the moments without squash and stretch were crucial: "When the characters are still, we want them to look like they have structure – they don't deform, squash or stretch."

"WE COULD BEND AN ELBOW 90 DEGREES BACKWARDS AND THE SKIN FOLLOWED IT ALL"
REX GRIGNON, HEAD OF CHARACTER ANIMATION

freedom is also extremely liberating, enabling animators to throw all realistic physical considerations out of the window: "With anatomically-based models you have to be aware that each joint has a limit," says Grignon. "Here we could bend an elbow 90 degrees backwards or forwards. The real breakthrough is that the skin follows it all – you can do anything and it still looks great."

Beyond technical considerations, the animators also had to develop their own approach to squash and stretch-based animation. Inspiration came from classic cartoon work from the likes of Bob Clampett, but ultimately a new style sympathetic to 3D had to be developed: "We were working with

a very different set of rules and just had to figure out what worked and what didn't," says Grignon. "And although these characters are very graphic, we had to place them in a very tangible world, with lighting, shadows and elements like fur. All those visual cues made it a little trickier to add squash and stretch."

Grignon explains that one of the prime uses of squash and stretch in the movie was to show pain. Alex the lion is the character who endures the most discomfort and displeasure, so it follows that his body is pushed and pulled in every way: "He'll get kicked in the groin and his feet will stay planted on the ground, but his whole body go right up into the air," he says.

The techniques also enable the animators to give less bone crunching moments added kinetic appeal. The golden rule was that they didn't deform characters that are still or holding a pose. Then when they move, it sets off a chain reaction of pliability: "We bend the characters a lot for the speed or 'breakdown' poses, to give us snappier animation and really highlight the body language," says Grignon. "Then the recovery from any squash and stretch animation is very tight, with minimal overshoot. It's only when you look at some of the in-betweens you see that they do get pretty crazy."

Grignon says the access to new squash and stretch tools was a dream come true for the animation team: "Even those who didn't come from a traditional background were interested in figuring out their own way of using it. It didn't take long for the whole department to grasp. Every time the dailies showed that one animator had pushed it further, it proved very inspiring, raising the bar for how broad we could take it.

"Even though squash and stretch has been around for decades (and has even been used in most CG movies to some extent), it's never been pushed to these extremes in 3D," he adds. "The powers that be at DreamWorks really wanted to take some creative risks, and everyone working on *Madagascar* was committed to pushing it as far as possible. I think our ability to produce this more cartoonish kind of animation can only make the studio even stronger." ●

Madagascar had its US premiere on 27 May. It is released across Europe throughout June and July, and in the UK on 15 July 2005

● Rob Powers used his experience with designs from James Cameron's *Aliens of the Deep* to create the 64-bit animation shown at the Windows Hardware Engineering Conference (WinHEC) this April

Rob Powers

Having just finished work on James Cameron's Aliens of the Deep, Rob Powers talks about his experience creating the world's first 64-bit animation for the recent WinHEC conference **BY CHUCK BAKER AND BEN VOST**

● Rob Powers' passion for marine biology shows throughout his work. This test shot helped him get work on *Aliens of the Deep*

● To see the entire project in all its large-format stereoscopic glory, you'll need to visit your local IMAX cinema

Tell us about yourself...

In school, I gravitated toward the arts and sciences, then when I was in high school won several awards for my art projects. At college level, my official training was in film production at the University of Southern California film school. What I learned there has helped me to develop a specific method for setting up a production pipeline which has become one of my specialities at the studios I've worked with.

How did you discover LightWave?

When I was busy making student films at USC, I saw a magazine ad for the first *Video Toaster* and was immediately infatuated. I saved my money and bought one as soon as I could. I was initially interested in the video production tools included in the *Video Toaster*, but quickly became focused on *LightWave* because it allowed me to make my own films without the need for anyone else.

What did you work on for Aliens of the Deep?

Most of the alien design, modelling, texturing, rigging, animation and final renders for the 'Europan alien encounter' sequence, and the design and creature animation in the main title sequence. The film was done in stereoscopic 3D before output to IMAX format.

Would you recommend LightWave for this kind of film work?

Definitely. The speed at which I was able to deliver the dynamics and character animations was a big reason why I was awarded this job. During the initial meetings for *Aliens of the Deep*, I could have a test animation ready within hours. I also added Worley Labs' *FPrime* for quick previews of the transparency, refractions, and reflections of the objects. The combination of *LightWave* and *FPrime* created a very noticeable productivity increase. At one point the art director asked me, "Why did I have wait for two days when I made changes before, and now I'm sitting with you and adjusting the textures and lighting in real time?" I just smiled.

How did you become involved in the project to produce an animation for the WinHEC keynote?

I had recently come off the *Aliens of the Deep* project when NewTek contacted me with the concept of creating a visual animation comparison of 32-bit vs. 64-bit pipelines as it relates to film and television production. We had a really limited time frame of about three and a half weeks, but even given the compressed schedule, it sounded so awesome that I knew I wanted to be involved in what they were doing.

● *LightWave*'s 64-bit version is almost ready, and will be a free upgrade for existing registered users of 32-bit *LightWave 8*

● The Windows Task Manager, showing how hard Rob was pushing the system when rendering his 64-bit animation

● Rob Powers in front of the rack of machines used to render his animation in time for WinHEC

● Backstage at this year's WinHEC conference. The guy on the left doesn't have a security badge! Stop him! Security!

● Rob Powers is always adding new tools to his toolset. Here, he has made a head using a combination of *ZBrush* and *LightWave*

What were the differences between what you could do in 32-bit and 64-bit environments?

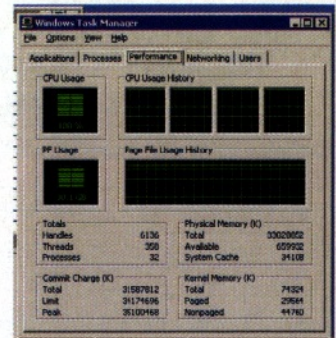The most profound difference was in the amount of detailed geometry in each scene. With 32-bit Windows, there is a limitation to the amount of RAM that is accessible to the software. Even though 32-bit hardware supports 4GB of physical RAM, your system is typically limited to about 2GB of per-process memory. So, all scene resources must be squeezed to fit. Both scenes had the same environment and background, but I could only get about 11 one-million polygon creatures in the 32-bit scene, while I was able to have 140 creatures in the 64-bit scene. Altogether it was about 150 million polygons all rendered in one pass! The multiple layers of raytraced refraction and transparency with 140 creatures all rendered together was very exciting for me.

What were the specs on the machines used for the project?

All the workstations used Nvidia Quadro FX 4400s and dual Opterons. The 32-bit workstation was maxed out with 4GB RAM for each processor and the 64-bit workstation had 8GB per processor. The render farm was composed of quad-processor Opterons with 32GB RAM each.

What was the breakdown of the two versions?

The project consisted of two 12-second 24p high definition sequences, one for 32-bit and one for 64-bit. I did everything in the scene: design, modelling, texturing, rigging, animation, lighting, particle effects and rendering. I also created the music for the clips.

It's important to understand the concept for the comparison. The project was never intended as a direct comparison of render speeds – for one thing, the 64-bit scene couldn't even be loaded on the 32-bit machine. I think focusing exclusively on render speed differences would be missing the point of 64-bit advancements: this project was meant to illustrate the benefits gained from these 64-bit software and hardware advancements.

Both renders were done in one render pass all in-camera. The 64-bit scene included radiosity, area lights, volumetric lights, raytraced shadows, transparency, refractions, reflections, HyperVoxel particles, fog, hi-res 4k Texture maps, and procedural textures. Also, the raytraced aspects of the scene were compounded by hundreds of creatures all rendered together.

Some people were confused by comments in the WinHEC keynote about the display options...

You mean that the 32-bit system was shown with many of the available OpenGL view options turned off, while the 64-bit system had them turned on? The intention was to show the limitations encountered when dealing with extremely hi-res scenes. The intent wasn't to say that you couldn't turn on textured OpenGL settings currently, but to illustrate how the systems would slow down when dealing with such heavy scenes. Many find themselves foregoing those resource-hungry settings for the sake of the workflow. With increased RAM overhead and system hardware advancements this will become less of a problem.

What was your biggest challenge?

I had to rethink how I approached this production. So many limitations were removed with the 64-bit *LightWave* systems that it took a couple of days to really sink in. After that, I started throwing as much complexity into scenes as possible. I had to reprogram my brain to not break things into typical layers – usually, I break my renders into layers for creative finessing in final compositing. It's not that 64-bit will eliminate layered compositing, but it will allow those layers to be so much more complex. Also, it made me realize how much of the layering I'm doing is actually due to inherent 32-bit system limitations. I had 32GB of RAM to play with and I used 31GB for the *LightWave* scene leaving the remaining 1GB for the OS. I pushed it absolutely as far as I could go! ●

MORE INFORMATION

You can compare the 32-bit version of the animation with the 64-bit version here:
[w] ftp://ftp.newtek.com/multimedia/Shows/WinHEC. *Aliens of the Deep* is showing at IMAX cinemas worldwide

ABOUT THIS ADVERTORIAL

This story was created by NewTek Europe in partnership with *3D World* magazine. Read the full version in the Community section of the NewTek website
[w] www.newtek-europe.com

Q&A

● Find out how to iron out problems with rigging in *Animation:Master* with a combination of Smartskinning and fan bones

QUESTION OF THE MONTH
Submitted by **Mechadelphia,
via the forums**

ANIMATION:MASTER

"How do I make the mesh over my character's joints deform correctly during movement?"

This month's question is answered by Shaun Freeman. Shaun has spent the last two years teaching senior secondary school students how to use *Animation:Master*, and is currently working as a freelance 3D artist

FACTFILE

FOR
Animation:Master 11

DIFFICULTY
Intermediate

TIME TAKEN
Three hours

ON THE CD
• Full-sized screenshots
• Unrigged model
• Intermediate and fully rigged models

ALSO REQUIRED
N/A

Rigging complex joints such as the shoulder and thigh is often awkward due to the large range of movement that is generally required of them. Areas that have a simple range of movement, such as the knee and elbow, are usually solved in *Animation:Master* through the use of Smartskin, fan bones, or (occasionally) both. Control point weighting is not so useful in such situations as its strength lies in its ability to minimise creasing over a wider range and in a much less specific way than can be achieved with Smartskin.

When used correctly, Smartskin can be a powerful tool for solving shoulder and thigh rigging problems. However, it is very time-intensive as the user needs to continually rotate the joint over a large range of movement, and manually correct the control point positions to ensure an appropriate mesh distortion occurs. To remove much of this time-consuming tedium, it's good practice to add to all of the joints in your character first, then create more subtle muscle movements using intermediate or fan bones. Finally, Smartskin can be used as a tidy-up process to add detail to these finer movements.

FANNY BONES

In this tutorial, I'll demonstrate how to rig a basic character (the Thom model, supplied with the *A:M* software upon purchase) to distort the areas that people have most trouble with – the thigh and shoulder. I will be using the bones that are used with the Hash 2001 rig, but the principles can be applied to any custom rig. I'll also discuss how to place and constrain fan bones to minimise mesh distortion, and a 'tidy up' method with Smartskin that avoids any unwanted control movement, which can occur if it is not applied correctly.

STAGE ONE | Inserting a skeleton and assigning control points
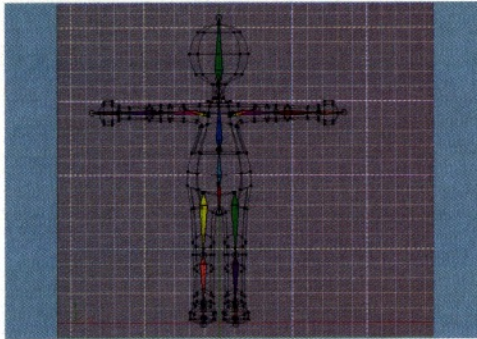
01 Insert a basic skeleton into your character. For details, read *The Art of Animation:Master* supplied with the software. I'm using the 2001 skeleton included with the application, but these principles can be used for any form of mesh distortion on any rig you choose to use, be it the Eggington rig or your own.
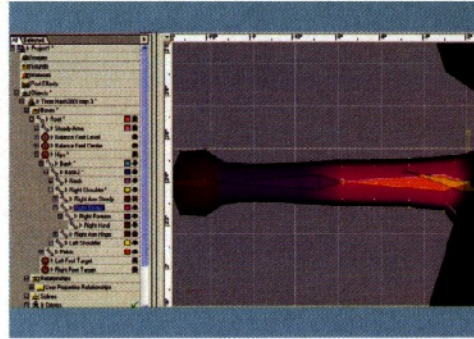
02 First, rig the right arm and shoulder. Assign the control points to the arm by ensuring you're in Bones mode, and assign the Right hand, Right Forearm, and Right Bicep to their associated CPs.

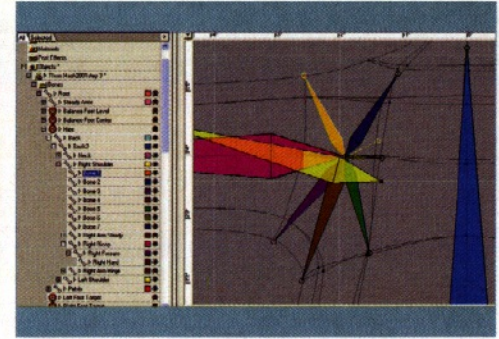**03** Click on the Right Shoulder bone (this is important to maintain appropriate bone hierarchy), press [A] to change to Add Bone mode and, from the base of the bone, create a new bone going from the base of the Right Bicep to the shoulder CP. Repeat until you've created a series of bones which will be associated with the surrounding CPs.

STAGE TWO | Renaming bones and creating a new pose
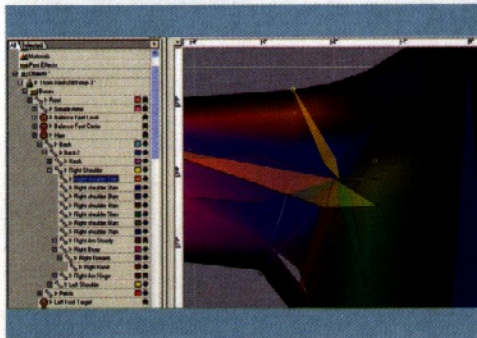
04 Rename the newly created bones 'Right shoulder 1fan', 'Right shoulder 2fan', and so on. Assign them to their respective CPs surrounding the shoulder. If you're unsure which, assign the most likely CPs. If they don't work, they can always be reassigned later to more appropriate control points.
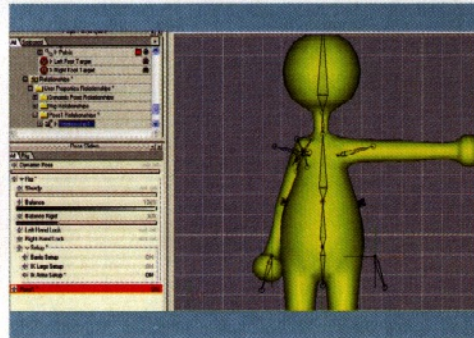

05 The next step is to create a new On/Off pose to assign the various constraints. Right click anywhere on the modelling window and select New > Pose > On/Off. This creates a new pose in which you can assign various constraints to your fan bones.
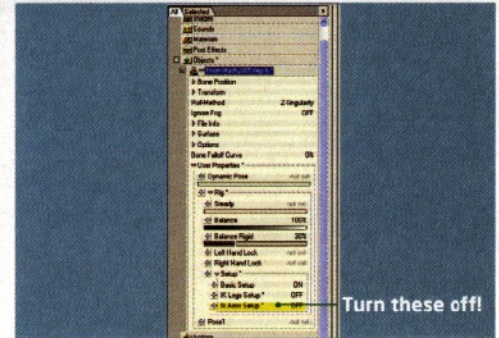
06 As you're using the 2001 Skeleton, before assigning constraints, you need to turn off the IK arms setup in the main model's User Properties menu. This makes the Arms bones visible and removes the IK constraints, which would make it difficult to complete the next few steps.

Turn these off!

STAGE THREE | Assigning constraints to fan bones in the new pose
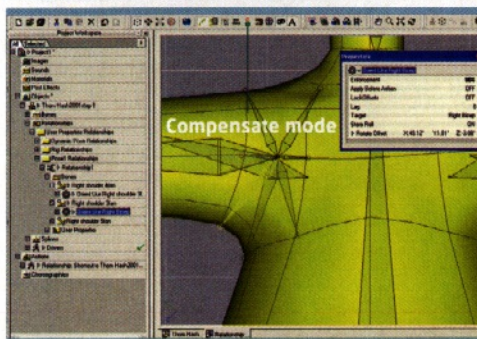
Compensate mode

07 In the newly created Pose (Relationship) window, right click on the Right shoulder 3fan bone, and select New Constraint > Orient Like. Click on the Compensate Mode button to ensure the bone stays in its original orientation after selecting a bone to Orient Likes, and click on the Right Bicep bone. Enter an enforcement of 80%. This makes the fan bone move with the bicep but perform only 80% of its rotation.
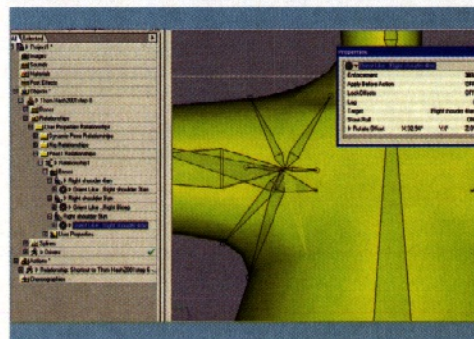
08 Now click on the Right shoulder 4fan bone, select New Constraint > Orient Like, and click Compensate mode, but this time select the Right shoulder 3fan bone. Enter an enforcement of 30%. This means that it'll orient at 30% of the first fan bone, which is orienting at 80% of the bicep bone. Repeat the process for the Right shoulder 5fan bone – this time the enforcement is also 30%.
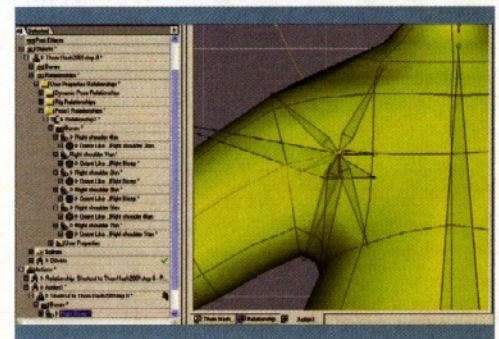
09 Repeat this process for the remaining fan bones around the shoulder. To test how it works, open up an action, turn on the new pose you've created and move the arm around. If a bone moves too much or too little, you can easily alter the percentage enforcement to improve the movement. Refer to the files on the CD if you need to check your settings.

STAGE FOUR | Creating new thigh fan bones
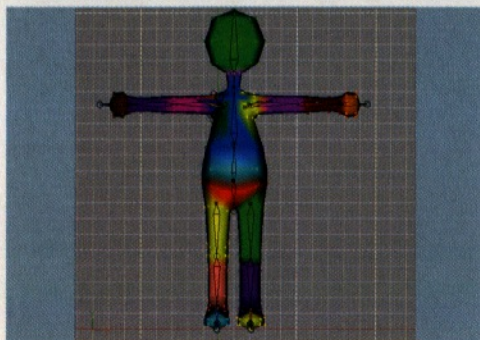
10 Go through and assign all the other control points for the rest of the body. This is important, since when adding control point weighting, it's necessary to have all CPs assigned: if CP assignments change after CP weights have been added, the effect of smooth mesh distortion may be affected.
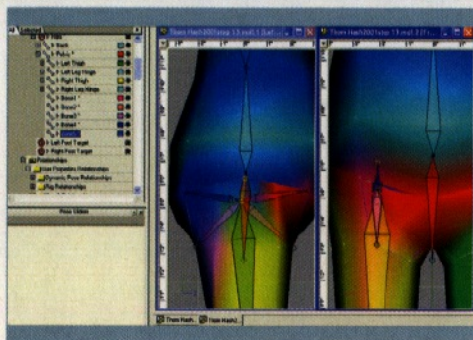
11 The process of adding fan bones to the hips is done in the same way as the shoulders. This time, click on the pelvis bone (to ensure correct bone hierarchy) and then add bones to associate with the surrounding CPs. Name them 'Right hip 1fan', 'Right hip 2fan' and so on. See the full-size screenshot and model on the CD for more specific placement with regards to CP association.

12 Right click on the Model window (but not the model), and select Edit relationship > User property relationships > Pose1 relationships > Pose1. This brings up the previous window in which you added your constraints. Turn off the IK legs option (as you did with the IK arm relationships). The next step is to add the graduated Orient Like constraints as you did with the shoulder.

STAGE FIVE | Creating new constraints for the thigh fan bones
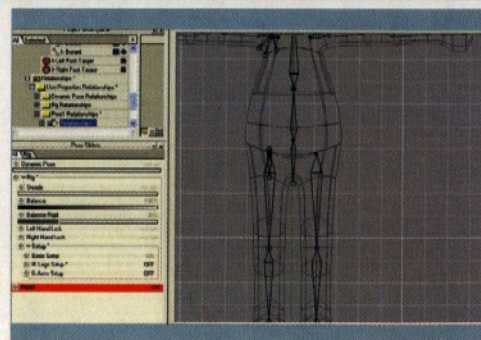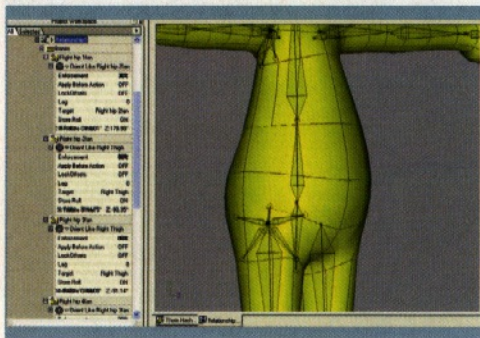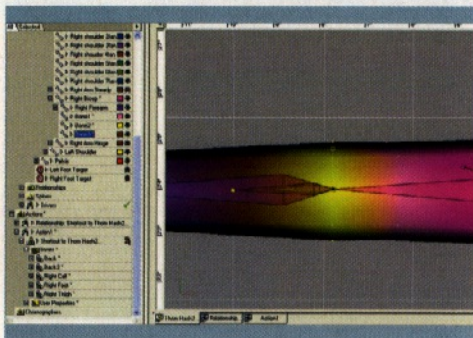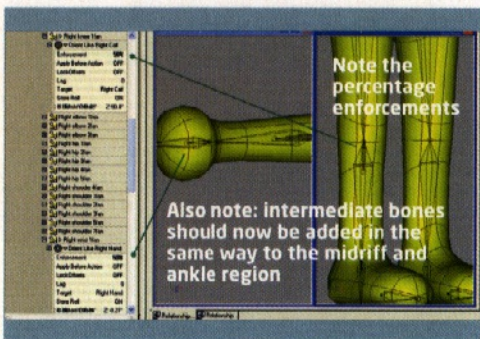

13 Set new Orient Like constraints as follows: 'Right hip 2fan' to Orient Like 'Right Thigh', Enforcement=80%; 'Right hip 1fan' to Orient Like 'Right hip 2fan', Enforcement=30%; 'Right hip 3fan' to Orient Like 'Right Thigh', Enforcement=80%; 'Right hip 4fan' to Orient Like 'Right hip 3fan', Enforcement=30%; 'Right hip 5fan' to Orient Like 'Right hip 1fan', Enforcement=90%.

14 Now the tricky shoulder and hip region has been fan-boned, it's a matter of adding intermediate bones to less complicated areas such as the knees, elbows and midriff. Click on the Right Bicep bone and add three bones with their pivot points originating at the point where the elbow bends. Assign the three rings of control points making up the elbow area to the three bones.
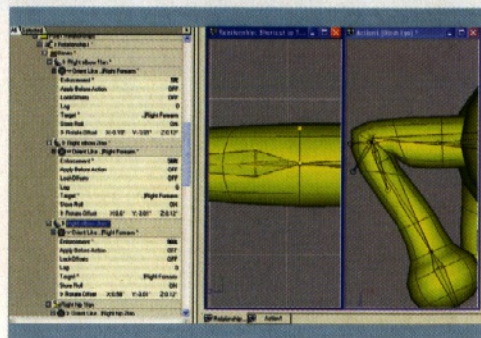
15 Rename the elbow bones 'Right elbow 1fan, Right elbow 2fan... and so on). Right click on the model window, and select Edit relationship > User property relationships > Pose1 relationships > Pose1. Click on the bone associated with the middle ring of CPs, and have it Orient Like the Right Forearm with an enforcement of 50%. Add Orient Like constraints to the other two bones, as shown in the full-size screenshot on the CD.

Note the percentage enforcements

Also note: intermediate bones should now be added in the same way to the midriff and ankle region

16 Repeat this process of adding fan bones to the knees and wrists. For this model, only one fan is required for the knee due to the modelling technique around this area (most other models would require more). It Orients like the Right Calf to an enforcement of 50%. The wrist also requires only one intermediate/fan bone and it Orients like the Right Hand to an enforcement of 50%.
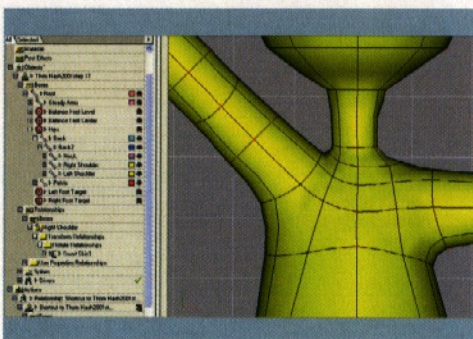
17 Time to start Smartskinning. In the modelling window, right click on the Right Shoulder and select New Smartskin. The shoulder will orient around the Y axis by 90 degrees. Adjust it so it rotates by only 45 degrees. Click on Muscle mode and adjust the CPs to suit. Note: when adjusting Smartskin, it's good practice to do so at an angle of 90 degrees, then 45, 22.5, 11.25 and so on.

Adjust by angles that are fractions of 90 degrees: e.g. 90°, 45°, 22.5° and 11.25°
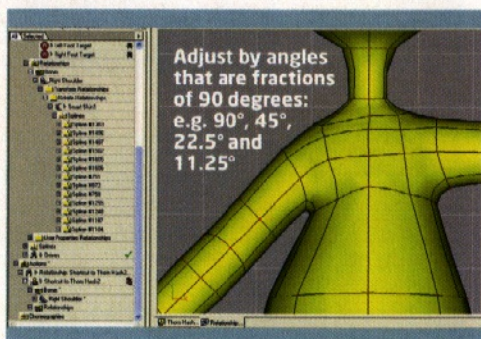
18 Again in Bones mode, adjust the bone to 22.5 degrees (45÷2). Adjust the CPs to suit. In complex models you'd continue at 11.25 degrees (22.5÷2), and so on. This is overkill with such a simple model, but the technique of creating Smartskin at such specific angles eliminates many odd CPs movements that can arise if not done this way. Repeat at Y = -45 degrees and -22.5 degrees.

STAGE SIX | Duplicating bones and mirroring Smartskin

It's very important that you turn this on in the model's User Properties before Smartskinning the rest of your model

The new Right hip fan bones should be dragged to sit under the original Pelvis bone, and then renamed Left hip 1 fan, and so on
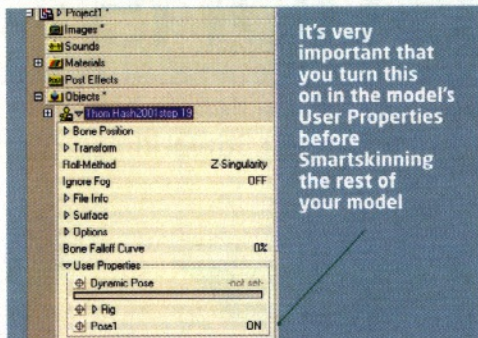
19 Ensure you've turned on the Constraints pose created previously in the model's User Properties and then go through and Smartskin the entire model in this way. It's important you do this after adding fan bones as it'll greatly minimise the amount of Smartskinning required, due to the already effective mesh distortion.
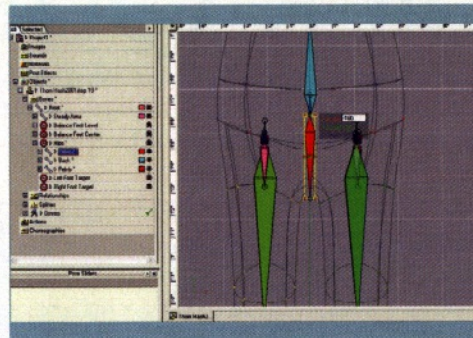
20 To add identical fan bones to the other side of the model, click on the pelvis and, with your finger on [Ctrl], drag it onto its parent bone (in this case, the Hips null). This copies the Pelvis bone and all its children. Click on the new Pelvis2 bone, and scale it -100% along the X axis.
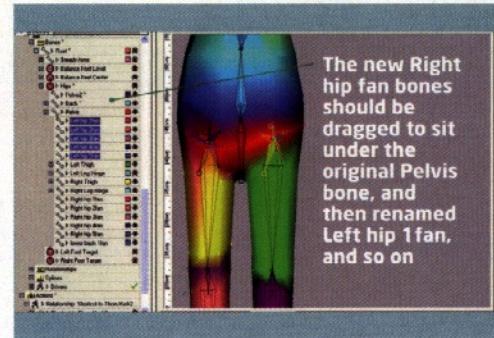
21 Drag any other fan bones you've created in this fashion to the appropriate hierarchy on the left leg. The new Right Knee 1fan2 should be dragged onto the Left Thigh bone, and renamed to Left Knee 1fan. Repeat this for all newly created fan bones. Once complete, delete the new Pelvis2 bone. Assign new bones to the appropriate CPs.

22 Repeat for the upper fan bones (shoulder, elbow and wrist fan bones) by holding [Ctrl] and dragging the Back2 bone onto the Back bone, scaling it along the X axis by -100%, and moving and renaming the fan bones to the other side of the model. In the Constraints pose, reassign the new Orient Likes as you did previously. Ensure all enforcements and constraints are identical to the originals.

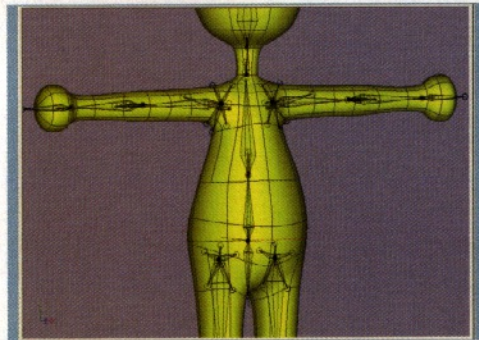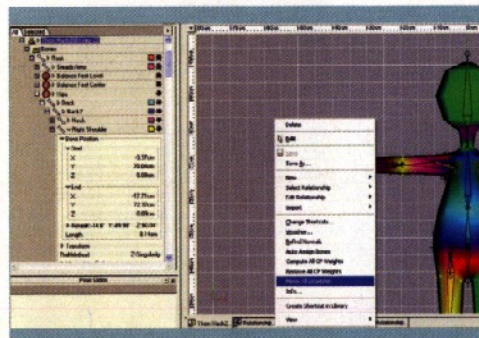**23** Smartskinning the opposite side of the model is a case of right clicking on the model and selecting Mirror All Smartskins. Assuming all the bones are in identical positions, the Smartskin will copy all the data across to the other side. In the case of this model, the main geometry bones haven't been placed in identical positions, so it's unfortunately a case of creating Smartskins manually.

24 As well as the use of fan bones, control point weighting can also be a very useful tool in minimising the amount of Smartskinning required on a specific model. Altering Falloff values in different bones and computing CP weights allows CPs to be affected by more than one bone, which results in a smoother method of mesh distortion. CP weights can also be directly edited by right clicking on the bone in question, selecting Edit CP weights and entering the values with which the CP is affected by different bones. Most rigging involves the use of more complex models than the one supplied here and, as such, will require a more thoughtful placement of bones. If done correctly, this system can be used to greatly speed up and improve the rigging process. ●

Forum | Post your software queries at http://forum.3dworldmag.com

Quick Questions

No matter which 3D software package you use, our experts are here to help. Send us your query and we'll provide the solution: **http://forum.3dworldmag.com**

Q&A
Our experts this month...

3DS MAX
Pete Draper is the VFX Director at Lightworx, Bristol. Everyone's impressed by his shiny balls...
www.xenomorphic.co.uk

BLENDER
Bassam Kurdali is a character animator and 3D addict who sometimes doubles as an electrical engineer
www.slikdigit.com

CINEMA 4D
Adam Watkins is the director of Computer Graphic Arts at the University of the Incarnate Word in San Antonio, TX
www.cgauiw.com

COMBUSTION
Andrew Tanousis is an Autodesk Certified Instructor. Currently he's looking into the long-term effects of sleep deprivation
www.metronewmedia.com

LIGHTWAVE
Benjamin Smith has thousands of puns about rods sliding together – none of them are suitable for publication
www.redstarstudio.co.uk

MAYA
Because **Gary Noden** uses Paint Effects, he can run his virtual toes through tall grass even in the depths of a northern winter
www.422manchester.co.uk

MOTIONBUILDER
Chris Ollis works at Codemasters and, in his spare time, writes for *3D world* magazine. He really, really, needs a holiday
www.InterTwined.co.uk

REALSOFT 3D
Tim Borgmann has been a freelance artist since the mid '90s, working with *Realsoft 3D, Softimage|XSI* and *LightWave*
www.bt-3d.de

XSI
Ola Madsen works as 3D artist for a company in Sweden, animating everything from medical treatments to furry teddy bears
www.digitalcontext.se

ON THE CD
● Scene files and screenshots for all the Q&As
PAGE 115

Q&A TIP
● As you're using values over RGB 255, 255, 255 white, you can enable exposure to get a more natural result. Try overlaying multiple outputs to simulate multiple 'exposures' using the Composite map

● By default, reflection highlights in *3ds Max* can look dull and lifeless (left). Modifying the output curve for a standard Low Dynamic Range map can greatly improve the effect

3DS MAX | Bright highlights in 'Low Dynamic Range' reflections

Q "Why do my environment reflection highlights always look so flat and dull?" **DEREK MOORE, VIA EMAIL**

A When anything white is reflected in an object that has less than perfect reflection, the software classes it as a standard colour, reducing its brightness. To combat this, you need to intensify areas of illumination beyond the default white, so that when they're reflected, they generate the desired bright highlights.

Using a High Dynamic Range (HDR) image will produce the correct result, but to create one is a time-consuming process. Shooting multiple plates of the same environment takes set-up time and can lead to problems, often requiring a lot of painting to get each exposure image right. In addition, shooting exterior shots is difficult as objects such as

clouds and foliage tend to move. Fortunately, it's often not necessary to use HDRI as you can just tweak the Low Dynamic Range (LDR) image.

The white in a standard reflection map needs to be brightened in order to stand out, so amend the LDR image's output curves by clamping off the values below the bright end of the curve. Next, crank up the white so that these values are multiplied several times to simulate a bright surface of illumination. This results in bright reflections from those parts that stand out, while most of the other reflected environment areas will not be as visible. For more details, see the files on the CD.

This is a quick-fix solution and is suitable in most situations. However, it's not suitable for images with areas of similar brightness, such as those with a lot of whites and yellows, as the output might not be able to differentiate between them. **[PD]**

● This test scene uses two images – the main environment background image and an unwrapped chrome sphere image, which is placed in the raytrace reflection's Environment map slot
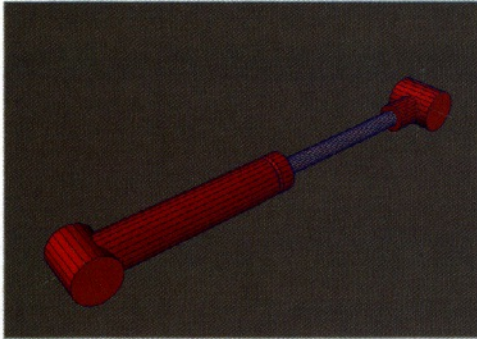

● The bright areas of the images are dropped into Output maps, the curve is clamped off and the top end value increased by a factor of 20, resulting in a bright highlight reflection

## LIGHTWAVE | How can I make hydraulic pistons that slide in and out?

ANDY GEE, VIA THE FORUMS

01 Model a piston in layers
Start with your piston model in Modeller. It should consist of a big part and a little part with a shiny metal rod, each in different layers. Place the pivot point of each layer at the point where they should rotate with the Pivot tool on the View tab. Save and load the object in Layout, then parent each part of the piston where you want them to be.
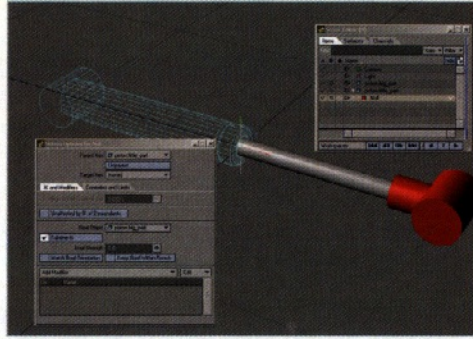
02 Add IK to piston parts
Add a null, parent it to the small part of the piston and move it so it's sitting right at the tip. Select the null and, from the Motion panel, set the big part of the piston to be its IK Goal, turning on Full Time IK. Select the small piston and, from the Controllers and Limits tab, make IK its controller in H, P and/or B as appropriate.
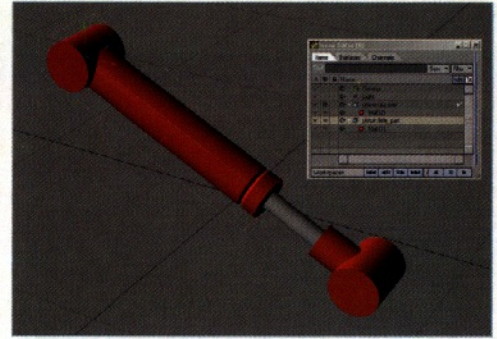
03 Test and repeat to complete
If you move the parts around, you'll find the small part will turn to face the big part. Repeat step two for the big part, making it turn to look at the little part and then you're done! Depending on how far apart your piston has to stretch, you can easily adjust the size of the shiny metal rod in Modeller so there's always enough to reach inside the big part. [BS]

CINEMA 4D | Animated Sweep NURBS

Q "How do I get that 'growing tendrils' look seen in so much 3D work today?" **DUSTIN SCOTT, VIA EMAIL**

A While 'growing tendrils' may not be the most detailed description upon which to base an answer, I suspect that you mean an animated effect in which thin, thread-like shapes appear out of nowhere and carve their way through virtual space. Luckily, creating this look in *Cinema 4D*, with its 'everything's animatable' functionality, is really easy.

The tendril-like shapes are best created with Sweep NURBS. These are made from two splines – one that acts as the contour of the shape, and another which defines the path the contour will 'sweep' along. Both splines can be made with *Cinema 4D's* Spline Creation tools.

LUCKILY, CREATING TENDRILS IN CINEMA 4D IS REALLY EASY

If you need a shape that wraps through text or around a shape, you simply draw the spline to follow the path you need. Often, the easiest splines to control and edit are any of the splines that are not drawn with the Freehand Spline tool.

To create a Sweep NURBS, create your two desired splines, create a Sweep NURBS object (Objects > NURBS > Sweep NURBS), and drop the two splines (parent them) into the Sweep NURBS object.

In the Objects manager, double click the Sweep NURBS object, and its attributes will appear below in the Attribute Editor. In the input fields under the Object section, you can determine the growth of the Sweep NURBS. By default, this is 100%, as the contour has grown the full length of the Path spline. By changing this, you change how far along the Path spline the Contour spline sweeps.

Right click on 'Growth' and select Animation > Add Keyframe. Change the Current Time Marker, change the Growth value to that shown on the right (a full-size screenshot can be found on the CD), and repeat to set another keyframe. The placement of these keys is editable in the Timeline or F-Curve Manager. [AW]
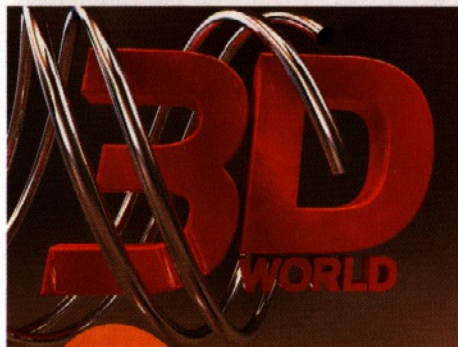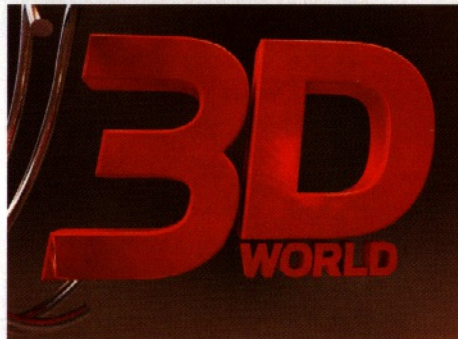
Q&A TIP
If you find that your tendril is growing the wrong way, reverse the path curve with Structure > Edit Spline > Reverse Sequence

● Growing tendrils is an easy-to-accomplish process in *Cinema 4D*. It uses a simple Sweep NURBS object, and can give organic fluidity to any scene

● To make a Sweep NURBS object appear to grow, set keyframes for the Growth input field of a Sweep NURBS object with a simple right click

COMBUSTION | Particle effects and operators
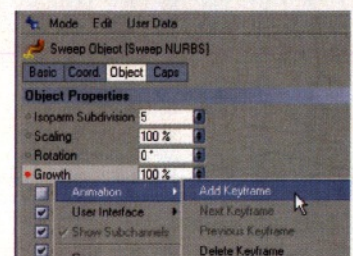
Q *"How do I create heat ripples rising off an aircraft, deforming anything in the background?"*
ACJ WALKER, VIA THE FORUMS

A The heat ripples that can be observed around the engines of a stationary aircraft are caused by subtle variations in the optical density of the atmosphere, as hot, lower-density air rising from the surface of the engine mixes with cool, higher-density air around it. Since the mixing process is turbulent and uneven, light travelling through this heat pocket is refracted in unpredictable and ever-changing ways, causing a visible atmospheric shimmer.

Fortunately, *Combustion 4.0* is a powerhouse packed with features that enable you to recreate these effects digitally, rather than having to copy and manipulate live-action heat ripples and then composite these new plates onto your base footage. The underlying principle here is to use particles and since both *Combustion* and *3ds Max* boast extremely powerful animatable particle systems, you should feel free to go ahead and experiment with both.

To start, fire up Ripple_Workspace.cws from the CD. Import Seaking.tiff and the Ripple.png sequence in the Heat_Particles folder. At Frame 0, press [F12] to go to Schematic view and drag from the Sea King Footage to the Composite to create a new Sea King Layer. In the workspace, click on the Sea King Layer to expand it and click on the Footage sub object.

Now press [F5] to bring up the Operators Tab, and select Distort > Displace. Click on the Displace operator and press [F8] to access its Tab. In Layer, choose the Ripples Footage, and set the X and Y Channels to Red and Green. Play around with Scale to achieve a balanced effect (these values can be animated).

Select the Displace operator and add a Gaussian Blur to soften the effect, and then a Compound Blur to create a blur based on the pixels of another layer – in Layer, be sure to select the Ripples Footage again. Full-size screenshots and project files can be found on the CD for you to experiment with. [AT]

Courtesy of Simon Reeves

Q&A TIP
● The Displace operator has channel controls. Rendering red and green particles lets the Red channel control horizontal displacement and the Green channel control vertical displacement

● Notice the exaggerated X and Y Scale settings This makes it easier to highlight the heat haze effect on a still image. Play around with these settings until you achieve a good balance

THE KEY TO A HEAT HAZE EFFECT IS TO USE PARTICLE SYSTEMS

● To soften the effect, add a small amount of Gaussian blur and also a Compound blur. For added realism, go in and increase the number of particles

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SOFTIMAGE XSI | How do I model an American football?

MARK ANDERSON, VIA EMAIL
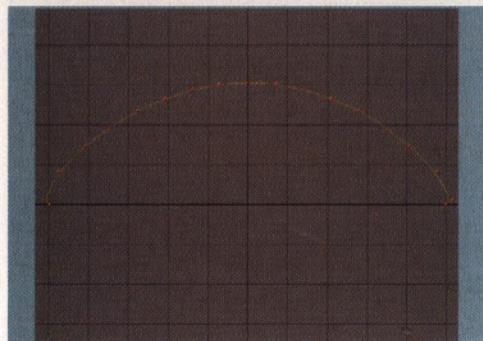
01 Creating the silhouette
Start by creating an arc from the Get > Primitive > Curve menu. Change the Start angle to 45 and the End angle to 135. Lower the radius to about 2 and increase the Subdivisions about 20. Press [T] and move to the points to match the profile on your reference image (or use the screenshot above). Make sure you have at least two or three points at each end of the arc to maintain a smooth shape.
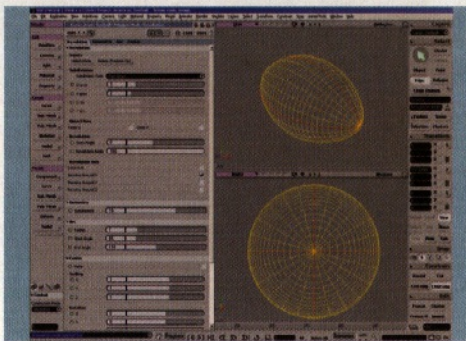
02 Creating the mesh
With the curve selected, click Transform > Move Center To Vertices. Next, click Create > Poly.Mesh > Revolution Along Axis. In the PPG, set the U span to 3 and V to 2. Change the Revolution Axis to X and (if needed) change the Center Translation along the Y-axis until the ends line up nicely. Press [E] and select both the horizontal and vertical edge rows, running across the centre of the football.

03 Adding the seams
Click Modify > Poly.Mesh > Bevel Components and set the Distance to about 0.5. Click [Ctrl]+[D] to duplicate the new edges. Press [Y] and select the newly created rows of polygons. Click Modify > Deform > Push and set the Amplitude to -0.05 to create the seams. Press the [+] key on your number pad to subdivide the geometry, giving you a smooth surface. [OM]

01 Paint Effects grass
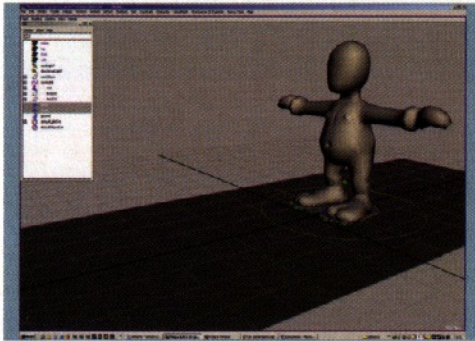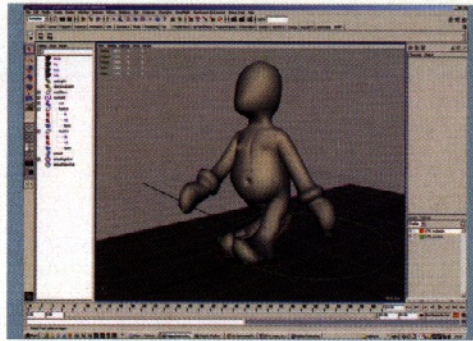Flattening grass? Ah, the joys of *Shrek*. Thanks to DreamWorks' fancy in-house software, the rest of us have been sweating blood ever since to satisfy our clients' movie aspirations. Fortunately, Paint Effects can do everything required – so long as you're willing to do some hand animating. Open up shot1.mb from this issue's CD.
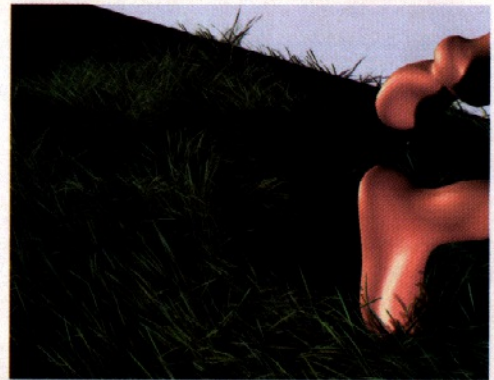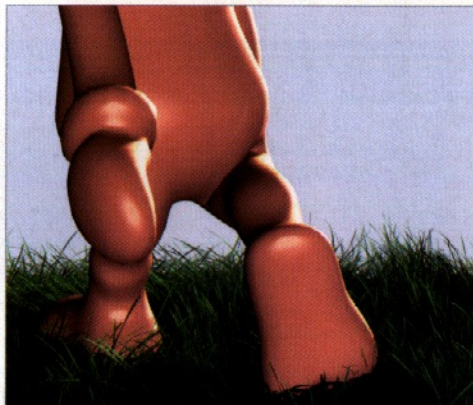
02 Footsteps
Create some virtual footprints by grouping Polygon objects to the character's feet controllers. MMB-drag the rfprint in the Outliner onto rfootCtrl in the group controlAll. Now do the same for lfprint onto lfootCtrl. Play the animation and the squidgy man will have the footprints stuck to his feet.
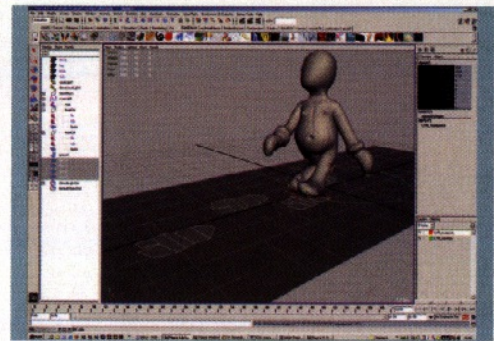
03 One step beyond
Scrub through the timeline to the points at which the feet fall and make a duplicate of each footfall, remembering to unparent the duplicates as you go. A quick way to do this is by pressing [Shift]+[P]. Select the new footprints, select all the Channel Box attributes and then RMB > Lock Selected to stop them from accidentally moving.
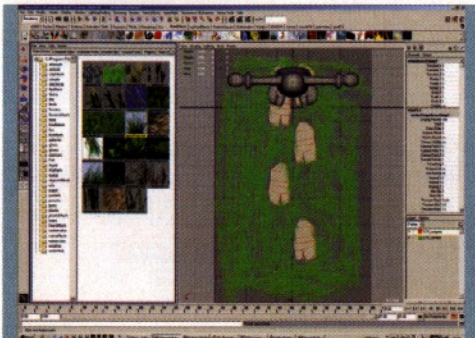
04 The green, green grass
Select the ground and, under the Rendering menu, select Paint Effects > Make Paintable. Change your main view to the Top camera and open the Visor Window, clicking open the 'grasses' folder. Click on grassClump. Now paint onto the ground in a single stroke everywhere except where the footprints are. Select your strokeGrassClump1 and, in its Shape node, set Display Percent to 33.

Q&A TIP
● Paint Effects are improved by turning on Render Globals > Paint Effects Rendering Options > Oversample. Or just render them separately and composite them in later

05 Respect the wind
Select strokeGrassClump1 and open the tab grassClump1 in the Attribute Editor. Open the Flow Animation rolldown. Set Flow Speed to 1. Open the Turbulence rolldown. Set Turbulence type to Grass Wind. With this selected, click Paint Effects > Get Settings From Selected Stroke. Select Paint Effects > Paint Effects Tool. Paint in your footprints.

06 Stepping out
Hide all the clumps except strokeGrassClump2 – your first footstep – for speed. Open the Attribute Editor and click the tab grassClump2. Open up the Behaviour > Forces rolldowns and click on Deflection. When you've done that, scrub through the animation and set a keyframe on the Gravity Slider above the Deflection button when the

character's heel reaches the clump. When the foot should flatten the clump, set a new Gravity keyframe of almost 1. The Grass Wind Turbulence displacement still moves the grass but not quite as much. Now turn off this clump and do the same for the next clump (and the next, and so on). When you've done all that, hide your foot prints, show all the grass clumps and render. **[GN]**

BLENDER | How do I fake Caustics in Blender?
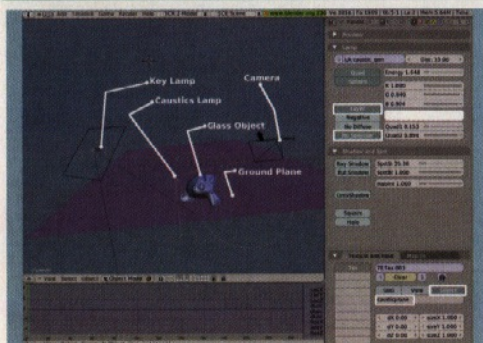
O1 Create a lamp for fake Caustics
The sample scene on the CD shows a glass monkey on a marble floor, lit with an Area light. Place the head on its own layer. For Caustics without photons, add a Spot lamp from the Toolbox. In the Lamp buttons, un-check 'Buf.Shadow', check No Specular and Layer, and make sure the spot and head are not on the same layer.
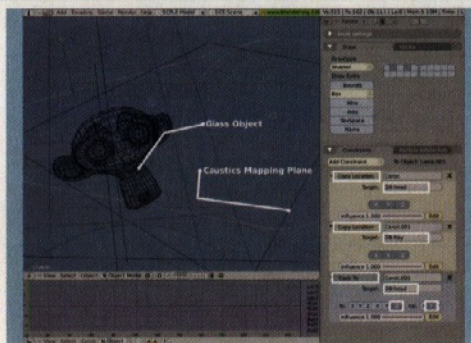
O2 Constrain the Caustics lamp
Pin the lamp between the Key and the Object with two Copy Location constraints, one to the Key lamp, and one to the Object. Aim the spot at the object with a Track To constraint in the Z axis. The up axis is unimportant (I used Y). Adjust the Spot size so it roughly matches the size of the object, and crank up SpotBl so it has nice soft edges.

O3 Define effect with a texture
Add an image texture to the spot to create the Caustics image. Use a plane to position the texture - in the Lamp button's Texture and Input panel, select Object and type the name of your Plane object. In the Texture buttons make sure Extend is on. The image defines the caustics pattern, and should have a black background and black edges. Experiment with the pattern, and with placement via the mapping plane. [BK]

REALSOFT 3D | VSL shading/texturing

Q "Can you tell me how I can create a microscope-like material? Every time I try it just looks wrong..."

A For a microscope material, you can use a self-illuminating surface, which is controlled by an Incidence (or View Fall Off) function. Because *Realsoft* doesn't have an out-of-the-box Incidence function, you'll need to build one on your own, which can be done in a few easy steps.

Create a new VSL material and select the Advanced view of the Property window. Drop a Surface Properties shader into the VSL window, put a variable into this shader and rename it 'FallOff'. Put three operations below the variable and change the type, input and output as shown in the image on the right. (You can find a larger version of the screenshot on the CD.)

As I mentioned before, you don't need a light and its shading because the surface is self-illuminating, so drop a constant black color into the shader and set the output to Surface:color.

Finally drop a Curve handler below the hierarchy, and change the input to FallOff and the output to Surface:illumination. Now you're able to fine-tune and colour the surface with the curve.

Assign the material with a Parallel mapping to your selected SDS objects and do a test rendering. It's nice so far, but you need a more irregular surface.

Drop a new shader into the VSL window and change the type to Surface geometry. Again put a variable into the new shader, change type to Float and rename it 'bh'. Drop a Noise under the variable and change the output to 'bh'. Tick the '1d' and 'smooth' checkboxes of the Noise operator.

Finally put a Linear handler below the Noise, set input to 'bh' and output to 'bump height'. Now you can control the Bump height with the multiply slider.

For the first test render, set it to something like 0,01. Because this value is measured in world units (metres) the resulting look very much depends on the size of your object.

If you want to use Displacement instead of Bump only, just go to your SDS object's Properties window and use the same value for the maximum displacement field as you used for the Bump height.

Full-size screenshots and project files for this Q&A are provided on the CD. Feel free to play with different settings and additional or other Bump structures. [TB]
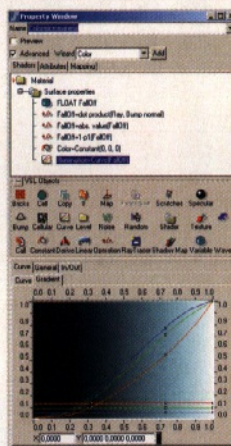
● The 'dot product' operation provides a value between -1 and 1 depending on the view angle. The other two operations are just for an easier handling

● A test render of the base microscope material, showing self-illumination controlled by the view falloff
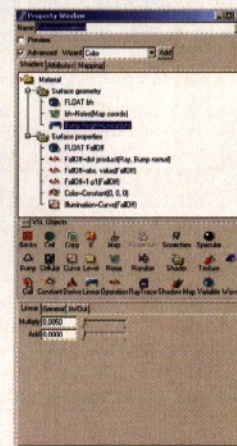
● This is the final VSL material for the microscope scene
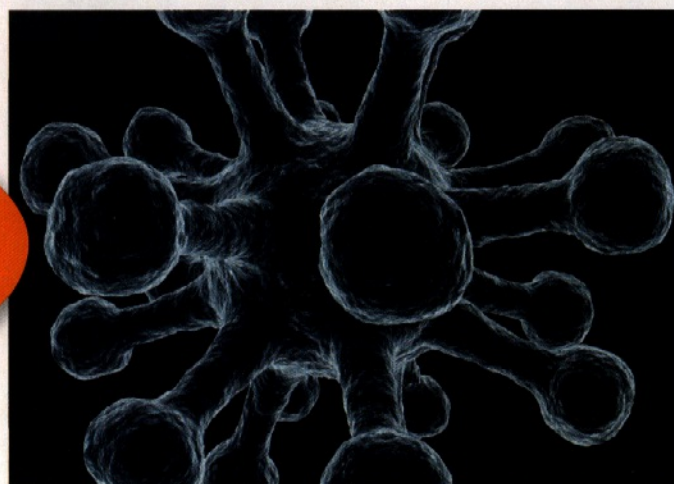
Q&ATIP
● You can use a NURBS curve to measure useful values for the Bump height and the maximum Displacement field

● The finished material. This final test render shows both the bump and the displacement enabled

MOTIONBUILDER 6 | Bigger, better, faster hand animations

Q "I've got a long animation to do and I'm way behind. Is there a quick way of animating hands?"
MIKE TSE, VIA EMAIL

A Hand animation is a fairly overlooked part of character animation as it's kept for simple messages like pointing or waving a fist at someone. But gesticulation is a language all of its own, and can be used to tell a story by itself.

Good hand animation requires hard work, whether you're aiming for a cartoon-like, pose-to-pose style, or the infinite complexities of a subtle and realistic human gesture. Luckily, with *MotionBuilder* there are a variety of tools. The IK and FK rigs provide control over each finger, which should make things fairly simple, but even with these, repeatedly setting the hand

GESTICULATION CAN BE USED TO TELL A STORY BY ITSELF

up can become tiring. The easiest solution is to utilise *MotionBuilder*'s Pose functions.

When you create a hand position you like, save it to the Pose Controls window. Select the IK nodes at the end of each finger (so *MotionBuilder* knows what you're saving) and click the Create button at the bottom. Change the default description to something memorable, such as 'Curled fingers Right' or 'Angry Pointing Left'. You can reapply these poses by selecting the finger nodes and hitting the Paste button.

While this might not seem like a major time saver at first, wait until you've built up a library. The poses work on a standard IK rig, so you can apply these hand shapes to any character in any *MotionBuilder* animation. Once you've created a few, select Save As and call the file something like '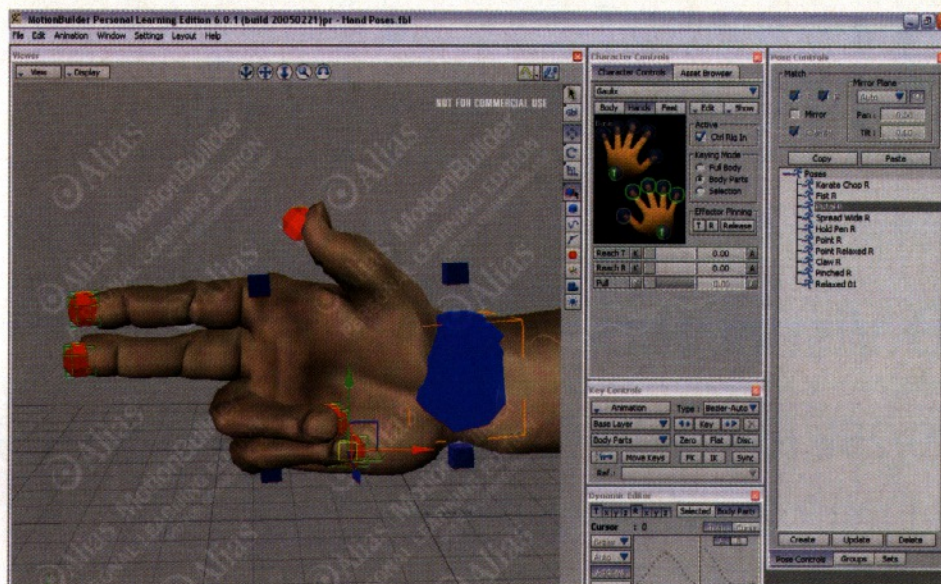My Hand Pose Library. fbx.' Then, in the big save options list that appears, deselect everything but Poses. This will create an FBX file of just your hand positions. Now, when you want to use them again in a new scene, you can simply merge the file in - just remember to resave any new ones you add to the list. **[CO]**

Q&A TIP
● Tick the Mirror box before pasting the pose down to apply a right-handed pose to a left hand. Just remember to label your poses as Left or Right-handed first...

● Each hand pose is saved to the Pose Control window. From here it can be renamed, reapplied or applied to the opposite hand

● Pose files were saved off and then merged in to this new scene. That way, hand poses can be reused throughout your animations

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CONUNDRUM | Send us your solutions to this month's brainteaser

E ach issue, we set you a real-world 3D problem to solve. The sender of the best solution will win the book or training DVD shown on the right. Our conundrum for last month was posed by *Softimage|XSI* user Mai Kennedy, who contacted *3D World* to ask:

"I want to imitate that 'globe' logo you have at the top of the pages in your magazine. But how do I create the look of the 'liquid glass' within the chrome sphere?"

Of the solutions proposed on the forum, the most detailed was posted by Simbo, who wrote: "First, create a Polymesh sphere. Give it a Blinn shader and under Specular, set its Roughness to 0.13 and the Specular Refraction to approximately 30. In the Render Tree, connect a Gradient node to the diffuse slot. Open up the Gradient's properties and delete all but two colour markers. Make one colour a dark blue-green (I used 0, 0.533, 0.278) and the other a lighter blue-green (I used 0, 0.865, 0.450). Set the gradient type to Radial Rainbow. Unfortunately, using the Radial Rainbow setting creates two poles on the sphere where the colours aren't smooth. However, in this case, these can be easily hidden by the metallic surface of the globe.

Liquids are darker in the deeper areas and lighter in the shallower areas. This can be seen at the edges of the globe.

To mimic this, create an Incidence node and connect it to the ambient slot of the Blinn shader. Tick the Invert option in the Properties dialogue box to make the front-facing polygons darker than the side-facing polygons and adjust the Bias until you are happy with the lightness of the sphere."

Congratulations to Simbo, who wins last month's prize. However, sticklers for detail might like to note that we showed the solution to our XSI Q&A guru Ola Madsen, who commented: "While this will give a watery/glass appearance, it would be better to use a more complicated set-up. From a technical standpoint, this method is not truly correct, since there is no transparency, reflectivity or Sub Surface Scattering."

THIS MONTH'S QUESTION
Our conundrum for issue 68 concerns texturing in *Maya*, and was posed by Asaf, who asks:

"Is it possible to create blendShapes that will also change the texture of an object as I go from one blendShape to another? If so, how do I set them up?"

As ever, post your solutions on the threads in either the General Discussion or the *Maya* section of the forum. The best solution will win a copy of *The Making of Leon* DVDs shown on the right.

Win Maya training DVDs

Send in your solution to this month's brainteaser, and you could win learning resources worth $79! *The Making of Leon* is a three-DVD box set with over ten hours of training, covering the process of bringing a production-quality character to life in *Maya*. Topics include modelling, rigging and skinning, MEL scripting, and facial setup. The set also includes the *Muscle TK* plug-in. For more details, see **www.cgtoolkit.com**.

To enter, post your answers on our forum **http://forum.3dworldmag.com**

Contact us | You can also email your Q&A questions to 3dw.qanda@futurenet.co.uk

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IN ISSUE #68

GOTHAM KNIGHTS – 19 JULY 2005

REVIEWS

HARDWARE / SOFTWARE / BUYERS' GUIDE

● On test this issue (clockwise from top): SensAble Technologies' PHANTOM Omni, Microsoft's Wireless IntelliMouse Explorer, 3Dconnexion's SpaceBall 5000, SpaceTraveller and SpacePilot

3D Controllers

GROUP TEST Can a better controller really increase your productivity and reduce the chance of RSI? According to these manufacturers, it can... **BY MAT BROOMFIELD**

About twenty years ago, mass computing was transformed by two inventions: the mouse, and a WIMP (Windows, Icons, Mice, Pointers) operating system. It provided a graphical way of controlling computers that transported the masses away from the abstract world of disk operating systems (DOS), and enabled them to see a visual representation of what they were doing. It heralded the dawn of the desktop-publishing revolution.

Today, controlling your PC seems so mundane that you only give it a moment's thought when your keyboard cord gets tangled, or your mouse ball gets dirty and your cursor stops moving. But is a keyboard and mouse really the optimal way of operating your computer, or is there something better out there for you?

Faster, more ergonomic, more intuitive, friendlier – better could mean any of those. But, just as a mouse transformed the way people worked in 2D, there might be a better way of manipulating objects in 3D... One of the problems in achieving such a transformation is the fact that, when you work in 3D, you still have to operate many controls in 2D. Thus, any new controller needs to be capable of operating in both environments, or it needs to work in conjunction with a more conventional controller.

Perhaps the most important criteria for a controller is its ergonomics. This expresses how comfortable something is to operate, and how healthy it is for you physiologically. It also refers to the effectiveness of your interaction with an object.

Intuitivity is perhaps one of the least essential features, but one which causes the most discomfort if it's absent. Of course, you'll want to pick up a new controller and start using it like a pro straight away, but in order to achieve greater efficiency, you'll need to learn a new way of working or thinking first.

A better controller provides a more efficient way of working in 3D space – it provides a more direct link between your mind and the scene window and its controls, and enables you to navigate more quickly, with increased efficiency. With that in mind, we selected five controllers to see if they could improve your working environment.

MASS COMPUTING WAS TRANSFORMED BY THE MOUSE AND A WIMP

TALKING POINT | Two-handed navigation – good for your health

A GREAT DEAL of your time as a 3D artist is probably spent moving around within your 3D scenes in preparation for editing. The fact that you must move the mouse out of the editing window, in order to operate the navigation controls, means that each tiny change of view wastes your time and increases your risk of repetitive strain injury (RSI). Controllers that simplify this process, or even share it between two hands, can both speed up your modelling and decrease the chance of debilitating injuries. And when you consider that, statistically, RSI accounts for 60% of all workplace related injuries, something as simple as a controller that is specifically designed for your work has got to be good for you, and your company.

DETAILS

PRICE
£49.99 / $91* / €73*
*Currency conversion
(includes VAT)

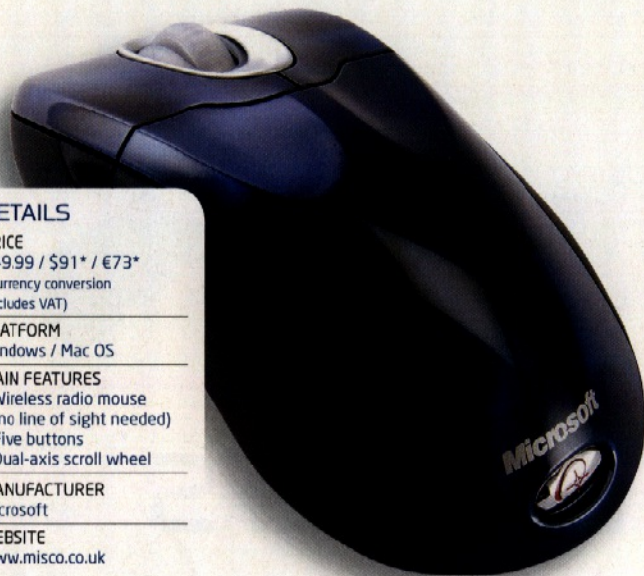**PLATFORM**
Windows / Mac OS

MAIN FEATURES
• Wireless radio mouse
  (no line of sight needed)
• Five buttons
• Dual-axis scroll wheel

MANUFACTURER
Microsoft

WEBSITE
www.misco.co.uk

Wireless IntelliMouse Explorer

By how much more can the humble mouse improve? Here's the latest model...

The mouse has remained the number one control device because it's easy to understand, and it's fast and intuitive to use. However, trends have come and gone and the Intellimouse represents the latest step in the saga.

The mouse is designed for right handed use, with strong sculpting to make it fit neatly into your palm. It has a total of five buttons, and a dual-axis scroll wheel. The scroll wheel is the most recent innovation, and it's the one new feature we had hoped would make it particularly friendly for 3D navigation.

Most of us are used to a scroll wheel that enables you to scroll up and down in a document, but this wheel also goes left and right. We had hoped the wheel functions could be remapped to keyboard functions, so it could be used to tilt and pan within the 3D workspace.

The mouse does include comprehensive installation and set up software, but we were disappointed to see that the remapping functions are limited to predefined keystrokes and operations (show desktop, copy and so on). Its usefulness as a specific tool for 3D applications is, therefore, disappointingly restricted.

However, its radio-wave wireless operation means that you're unfettered as you use it and, with up to three times the battery life of the previous generation, you won't be forever rushing off for those long-life batteries. However, a simple off switch would extend the batteries much further. Its Intellieye light-beam motion detection system provides far smoother operation than the old ball mechanism, and it's far less prone to clog.

There's no doubt that the IntelliMouse Explorer is a much better mouse to the norm, but it is still just a mouse. It could so easily have offered more to all users but it falls short of greatness.

VERDICT

PROS
• Stylish
• No cord
• Intuitive

CONS
• No 3D functionality
• Limited programmability

RANGE OF FEATURES	6
VALUE FOR MONEY	8
OVERALL	**7**

DETAILS

PRICE
£340 / $622* / €494*
*Currency conversion
(includes VAT)

PLATFORM
Windows / Linux / UNIX

MAIN FEATURES
• Navigator with six degrees
  of freedom
• 12 programmable buttons
• Drivers for over a hundred
  applications

MANUFACTURER
3Dconnexion

WEBSITE
www.3dconnexion.com

SpaceBall 5000

For better 3D work, you need a controller that's designed for a 3D environment. Meet one of the first

The SpaceBall 5000 is designed for left-handed operation (as well as right), while you use your mouse in your other hand. The great thing about that is that you lose none of the benefits of a mouse, but you gain additional functionality. Although there isn't a learning curve exactly, there's certainly a familiarity curve as you get used to the gentle touch and the oddness of two-handed operation.

The unit consists of a spherical rubber controller, mounted on a base that has an ergonomic wrist support. There are also 12 buttons that are strategically positioned on the base, so they can be operated with your fingers while still manipulating the ball.

The ball provides slide and rotation in all three axes – giving six degrees of freedom – and can be lifted and pressed. The thing that makes it so useful is the fact that it comes with custom drivers for over one hundred applications. These enable you to use the SpaceBall as an integrated part of the design and navigation process, rather than a bolted-on addition to it. We tested it in *3ds Max*, and the controller enabled us to pan, zoom and rotate within a scene. When you consider the proportion of your time that's spent navigating, you'll realise that the SpaceBall can be a huge time-saver. In fact, 3dconnexion says that independent studies reveal an increase in productivity of up to 30 per cent.

Furthermore, you can assign your own macros to the unit's keys, enabling you to execute frequently used operations at the press of a button.

If we were to level one criticism at the unit, it would be the fact that there's no tactile distinction between movements in each of the axes, so you'll often find your motion drifting across into multiple axes at a time. The SpaceBall offers a dramatic enhancement in 3D application control.

VERDICT

PROS
• Fast to navigate
• Works with all apps

CONS
• Hard to restrict movement to a
  single axis
• Takes a while to learn

RANGE OF FEATURES	7
VALUE FOR MONEY	6
OVERALL	**7**

DETAILS

PRICE
£ 3,526* / $2,795 / €2,795
*Currency conversion
(includes VAT)

PLATFORM
Windows

MAIN FEATURES
• Sculpting and control tool with six degrees of freedom
• Includes intuitive Claytools software
• Provides force feedback

MANUFACTURER
SensAble Technologies

WEBSITE
www.sensable.com

DETAILS

PRICE
£340 / $622* / €494*
*Currency conversion
(includes VAT)

PLATFORM
Windows

MAIN FEATURES
• Navigator with six degrees of freedom
• Eight programmable buttons
• Drivers for over a hundred applications

MANUFACTURER
3Dconnexion

WEBSITE
www.3dconnexion.com

PHANTOM Omni with ClayTools for 3ds Max

A sense of touch is a powerful tool when it comes to modelling. This is the only device that lets you use it

Although the digital workspace provides greater versatility and precision than in the real world, it lacks immediacy and tactility. When you model with materials such as stone, clay or wood, you can tell in an instant how your efforts are progressing. Even more fundamentally, you can tell a little about the material by touch alone: its plasticity, its basic form, its weight.

The PHANTOM Omni is a remarkable device that attempts to bring most of the benefits of the real world into the digital domain and adds some unique digital benefits. The device is essentially a pen mounted on a mechanical arm. As you move the pen, the cursor moves on the screen in 3D space. When the cursor encounters the surface of the screen model, the pen provides resistance. Once you've encountered a surface on your object, you can literally trace the shape of the object in the real world with the resistance of the pen. More importantly, you can quickly sculpt new shapes.

The PHANTOM Omni is available with *Claytools* (or the developer toolkit). This is a voxel-based clay-modelling environment

that's a bit like metaballs on steroids. It uses a clay metaphor, whereby you use the pen to add or melt away clay. This is a fast and intuitive way to create organic models, or add detail to existing models – novices will be up and running in minutes.

There are drivers available for *3ds Max, Rhino,* or *Maya* (from August), and while they enable you to navigate quickly and efficiently, they also provide unique modelling features such as the ability to move inside objects (without first having to hide geometry) to make modifications.

A remarkable device, the PHANTOM Omni is limited by its inability to work with all 3D software packages and its hefty price, meaning only the truly dedicated modeller will be able to justify it.

VERDICT

PROS
• Unique control and design features

CONS
• Associated with specific app
• Needs expert programming for use with all 3D software

RANGE OF FEATURES	8
VALUE FOR MONEY	8
OVERALL	**8**

SpaceTraveler

Two-handed control is not just a luxury for the desktop or workstation – mobile users can enjoy too

As you'd expect, the primary focus of our controller reviews is on devices that enhance the 3D experience – particularly those aimed at powerful workstation users. However, as the SpaceTraveler demonstrates, mobile users can also benefit, and the gains can be enjoyed across a range of 2D programs too.

The SpaceTraveler is a model of compact elegance and efficiency. It measures about two inches across and comprises a weighted stainless steel base and a floating puck that can be gripped between your thumb and forefinger. Although you might think a device that small would constantly be slipping away from you, the weighted base keeps it in place quite satisfactorily. Around the base are eight illuminated blue buttons that can be programmed with your own macros or key combinations.

Of all the 3Dconnexion motion controllers, this one is the most delicate and, as a result, it feels like using a precision instrument instead of a heavy-duty tool. Consequently, it has the shortest familiarity curve, and feels the most pleasant to use.

Like its two stablemates, this ultra-compact device enables you to rotate, pan, and zoom – in fact you can move and rotate in every axis. It comes with drivers for over a hundred programs, including the major 3D apps. The interesting thing is the way it also supports 2D programs such as *Acrobat, Excel* and *Photoshop.*

Within such applications, the controller might be used to zoom into a document, or select custom tools, all without taking your hand from the mouse.

The SpaceTraveler is a wonder of compact design and, although it's intended for laptop users, it offers a very real desktop alternative to the SpaceBall 5000. Overall, it's very pleasant to use, if somewhat pricey.

VERDICT

PROS
• Fast to navigate
• Increases productivity
• Works with all apps

CONS
• Expensive
• Awkward buttons

RANGE OF FEATURES	8
VALUE FOR MONEY	6
OVERALL	**7**

THIS ISSUE'S WINNER

SpacePilot

It's rare to find a piece of equipment that changes the entire way you work, but this is such a device

DETAILS

PRICE
£375 / $685* / €545*
*Currency conversion
(includes VAT)

PLATFORM
Windows

MINIMUM SYSTEM
• Windows 2000/XP
• Pentium III
• 20MB HD
• USB 1.1 or 2

MAIN FEATURES
• 3D controller with six degrees of freedom
• Six programmable buttons
• LCD info screen
• Many instant function buttons
• Drivers for over a hundred applications
• Fully reprogrammable
• Optical detectors for long life and high sensitivity

MANUFACTURER
3Dconnexion

WEBSITE
www.3dconnexion.com

CONTACT
+44 (0)1451 824344

The SpacePilot is the latest in a series of devices from mouse-manufacturer Logitech's professional division, 3Dconnexion. It's been primarily designed for controlling 3D applications, and it comes with drivers for a vast number of programs.

The unit consists of a floating puck that sits atop a slim-line base. At the rear of the base there's an LCD screen and, surrounding the puck, there are a host of control buttons.

The circular puck moves in X, Y and Z axes, and can be rotated in all three axes as well. This provides six degrees of movement, enabling any object to be positioned or viewed. It uses optical sensors and has a very light touch. However, the sensitivity can be turned down, allowing you to learn the device without your slightest movement sending your geometry spiralling off into space.

The drivers automatically configure so that when you launch or switch to the appropriate application, the SpacePilot is reprogrammed via the USB port. For instance, in Default mode (in *3ds Max*), the Puck controls the camera, enabling you to navigate with your left hand while you edit with a mouse in your right.

There are six pre-programmed function buttons, and a Config button that can be used to access additional sets of button options. You can assign as many banks of controls to these buttons as you like, defining any macros that you require. The button functions are displayed in the large, easy-to-read LCD screen above them. There are a set of four modifier buttons ([Esc], [Shift], [Ctrl] and [Alt]), which can be used in conjunction with the six primary buttons to extend functionality.

There's also a Fit button, which (in a 3D application) automatically resizes the view to fit the current selection. Just above that are four buttons that instantly move the camera to one of the four primary views (left, right, top, and front), as well as an additional button that can be used to lock off the 3D controls. Last but not least, the Dorm and +/- buttons are used to adjust the puck's sensitivity.

The SpacePilot provides an immediate and obvious increase in productivity, ensuring that you spend minimal time navigating and more time editing. 3Dconnexion has increased its functionality further by providing drivers for applications as diverse and unlikely as *Excel*, *Word*, *Acrobat* and more. In some of these applications, its functionality seems somewhat dubious. For example, within

THE SPACEPILOT ENSURES YOU SPEND MINIMAL TIME NAVIGATING AND MORE TIME EDITING

Word any serious user will have two hands on the keyboard.

The SpacePilot is expensive, but it will more than pay for itself in time saved and overall convenience if you're a daily computer user.

VERDICT

PROS
• Versatile
• Increases productivity
• Time-saving
• Works with all software

CONS
• A slight learning curve

RANGE OF FEATURES	10
VALUE FOR MONEY	9
OVERALL	**9**

IF YOU BUY A WIRELESS MOUSE, YOU'LL ENJOY ALL THAT CABLE-FREE FUNCTIONALITY, AND YOU'LL KNOW PRECISELY WHAT YOU'RE GETTING. BUT IT WON'T EXACTLY ROCK YOUR WORLD...

CONCLUSION | Horses for courses

The purpose of this group test was to examine your 3D controller options, rather than to compare similar devices. As such, each device has been considered and evaluated on its own merits, rather than comparatively. Having said that, as 3Dconnexion dominates the controller market, and three of its devices perform almost identical functions, comparisons between them are perfectly valid.

We were surprised at the lack of alternative offerings, despite our efforts to track down products from other manufacturers. We were also quite shocked at how costly most of these devices were. We were particularly taken aback by the PHANTOM Omni, when over 70 per cent of that cost is accounted for by the software, not the hardware. However, as 3Dconnexion is at pains to point out, the cost of the equipment is not the issue – the amount it saves you is. Weighed against the salary of a designer on £30k ($50K), even a 10 per cent improvement in productivity pays for itself in 3-6 months. Moreover, when you look at the PHANTOM Omni, it enables you to do things that seem impossible within a realistic timeframe, or are financially infeasible using conventional tools.

GET WHAT YOU GIVE

Usually in our group tests, you'll find a product whose price is based upon reputation rather than capability, but in this round up, there was a fairly linear correlation between the price you pay and the potential benefits. While $2,795 seems like a vast amount to pay for a 3D mouse, when you consider that it's just a few weeks of a game modeller's salary yet it enables a huge increase in productivity in certain types of projects (creating high-res geometry for generating normal maps for instance), then the cost seems altogether more reasonable.

So it really is a case of horses for courses. If you buy a wireless mouse, you'll enjoy the cable-free, zero-learning-curve functionality, and you know precisely what you're getting, but it won't exactly rock your world.

On the other hand, if you want a better way to navigate, any of the 3Dconnexion devices will do nicely. But if you want a better way to create new worlds and objects, the incredible PHANTOM Omni fits the bill. To be honest, it could easily have blasted away the competition, but for one critical and insurmountable flaw – it only works within selected software packages. Thus, even as a navigational tool, if you want to use it with LightWave, Poser, Cinema 4D, Vue or any of a hundred other packages, it's tough luck. But if you only use Rhino, Maya, or Max, you're laughing.

Although the SpacePilot doesn't offer such fantastic functionality, its overall versatility and well-considered ergonomics make it our 3D controller of choice. ●

PERFORMANCE COMPARISON

MODEL	DEGREES OF FREEDOM	HAPTIC/FORCE FEEDBACK	WIRELESS	WORKS WITH ALL APPLICATIONS	DRIVERS FOR	USED WITH MOUSE	REPROGRAM-MABLE	USER SDK	INTERFACE	PRICE	SCORE
SpaceBall 5000	6	N	N	Most	100+ applications	Y	Y	Y	USB/serial	£289	6
PHANTOM Omni	6	Y	N	N	Max, Rhino or Maya	N/A	Not by untrained users	Y	FireWire	£3,526*	8
Wireless IntelliMouse Explorer	2	N	Y	Y	Everything but special functions in Microsoft apps	N/A	Presets only	N	USB	£49.99	6
SpaceTraveler	6	N	N	Most	100+ applications	Y	Y	Y	USB	£289	7
SpacePilot	6	N	N	Most	100+ applications	Y	Y	Y	USB	£319	9

Hexagon

With polys, splines and sub-Ds, Eovia's plucky new modeller looks to have all the angles covered – but can it compete in today's crowded market? **BY STEVE JARRATT**

When Luxology launched *modo* last August, we questioned the sanity of trying to take on so many modellers - the all-in-one suites such as *LightWave* and *XSI*, plus inexpensive standalone applications such as *Silo*, *Nendo*, *Wings 3D* et al. Well, it's clear that Eovia thinks there's still some mileage to be had from the market, as it has just unleashed its own low-end polygon-pusher.

At first glance, *Hexagon* appears to be the handsome offspring of *Amapi* and *Carrara*, borrowing elements from both but forging them into a much more coherent whole. Apart from a few traditional Eovia oddities – such as the word 'Validate' instead of 'OK', and its reliance on non-system menus – *Hexagon* looks appealing and suitably non-threatening.

Eovia's stated goal with this new app is to provide an entry-level modeller for the *Poser*/*Vue*/*Bryce* crowd, while also creating a companion to programs like *ZBrush*, which have no core polygon tools of their own. Naturally, it also plugs straight into *Carrara*'s pipeline (reports indicate that it works with *Carrara* far better than *Amapi* ever did).

The 165MB download installs painlessly and includes a range of models in *Hexagon*'s native .hxn format, plus a comprehensive 228-page PDF manual. This provides a

● *Hexagon*'s Dynamic Geometry, brought over from *Amapi*, keeps track of sweeps and extrudes. You can alter the shape of an object by clicking on the requisite curve and moving points or edges

straightforward explanation of *Hexagon*'s functions, as well as featuring embedded *QuickTime* videos that showcase most of its tools in operation. It also includes two tutorials, but these are painfully basic (the classic fluted vase tutorial has been around since early versions of *Amapi*). We'd like to see the documents updated in accordance with the application, in turn gaining additional video clips and more advanced tutorials.

The surprising thing about *Hexagon* is its vast range of tools. As well as basic box modelling using sweep and extrude

functions, it also works with splines to form complex surfaces and has powerful Boolean functions. In addition, objects can be collapsed and progressively subdivided. As such, it has quite a wide feature set, including a huge variety of line drawing tools, presumably the end result of years of *Amapi* development.

MODEL BEHAVIOUR

Freeform modelling has also been thoughtfully implemented: draw a poly on screen and select an edge, then hold a Modifier key and drag – *Hexagon* quickly and simply extrudes a new poly; select multiple edges and you extrude multiple polys in one go. Performing the same movement on a polygon face creates a box extrusion. And the addition of a 'Universal' modelling cursor lets you move, scale and rotate without switching tools, so doodling with polygons is a flowing, organic process.

Hexagon also features a healthy set of selection tools, including an Automatic mode, which toggles between polys, edges and points depending on the first element selected. Once highlighted, you can grow or shrink the range, activate ring and loop selection, select alternate items, or employ manual Lassos. The only problem we encountered is that, once selected, elements occasionally become 'sticky' and a
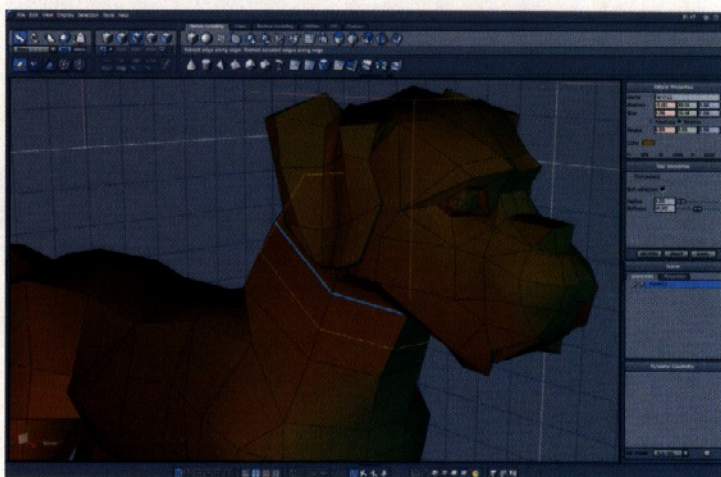
● When modelling, it's a simple matter of creating new geometry with the Extract Edge tool. Just select an edge, click 'Loop' and then drag the coloured marker to make a new set of edges

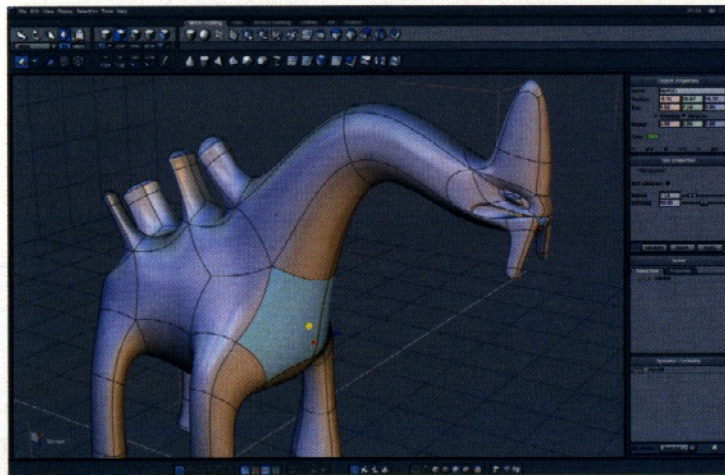simple click doesn't always deselect or reselect them.

Hexagon features a powerful Chamfering tool for the creation of smoothly bevelled edges, but there's still some problems with filleting, which occasionally removes faces when you try to fillet too many edges. You can perform sweeps and extrudes on polys, points and edges (which is more than can be said of some of the more expensive 3D apps). It also features a rudimentary, but very useful, Soft Selection mode with which you can adjust the strength and area of deformation when moving mesh elements. However, Eovia has drawn the line at full-on Edge and Point weighting for subdivisions, though that must surely be on its to-do list.

Other missing functions include a decent Knife tool, a Bridge tool and easier ways of working with symmetry, beyond the included mirror function. There are also some strange omissions, such as the simple ability to create a box with segmented faces as the basis for a sub-D model.

TEXTUAL HEALING

But one of the biggest disappointments is the Text editor, which provides only the most basic of text input and bevelling options. One could argue that there's a host of places to go to generate bevelled 3D text, but it does feel like a stock feature that should have been flawless and fully formed right from day one.

Still, despite a few teething troubles, *Hexagon* is an interesting and capable release with stacks of potential. It borrows a lot of very powerful features from *Amapi*, and even takes a few leaves out of *modo*'s book (an application currently retailing for

$695) with its custom workplane, attractive OpenGL and general ease of use. At the current introductory price, *Hexagon* represents good value for money (although we're not impressed that US buyers can get the app at the equivalent of £92 – nearly £50 off the UK price including VAT, even though it's an electronic download).

busy marketplace will come down to each company's speed of development and innovation (or at least its speed at implementing the competition's innovations). For *Hexagon* to be a viable and attractive alternative it needs to have the bugs quickly eradicated and to have a regular, reliable upgrade path.

● This creature was doodled using sweeps and extrudes. Tap the space bar to constrain the extrusion along an axis, and hold [Ctrl] before a sweep to grow or shrink the size of the end poly

● A model before and after subdivision. The striped reflection map helps you see how the curves of the object flow

● The text tool is functional but basic. It's limited to a single bevel, although you can tessellate the type to make it smoother

HEXAGON IS AN INTERESTING AND CAPABLE RELEASE WITH STACKS OF POTENTIAL

The initial release of *Hexagon* has some serious bugs, and while most have been rectified with the v1.01 update, it's unfair that early adopters received an app that wasn't quite finished (sadly, the consumer as unpaid beta tester seems to have become standard procedure these days). Ultimately, guaranteed success in this

To their credit, the developers have created a very solid base on which to build. *Hexagon* has a better toolset than one might expect for the price and, given its intended user base, includes as much functionality as most low-to-mid-range users will need. Doodling with the sweep and extrude tools is easy and fun, and it's ideal for sketching out a basic mesh ready to throw into *ZBrush*. If you already own a dedicated modeller, then this release isn't going to cause you too many sleepless nights... but a bug-free second version with some clever new features might be a different matter. Watch this space! ●

● Basic materials can be applied to 'shading domains' or groups of polys, with colour, specularity and transparency. This is mainly designed for moving to and from *Carrara*

● Models are organised with a *Photoshop*-style Layers palette. Grouped objects appear nested within the parent object
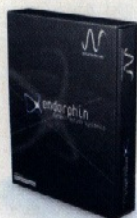
VERDICT

PROS
• Freeform modelling is easy
• Mixes sub-D, spline and polygon modelling

CONS
• A few remaining bugs
• Some key tools missing
• UV mapping is really basic

RANGE OF FEATURES	8
VALUE FOR MONEY	7
OVERALL	**8**

endorphin 2

endorphin's ragdoll stuntman makes a welcome return with incredible accuracy, adaptability and common sense – there really isn't anything like it   BY CHRIS OLLIS

For those who have missed previous reviews, endorphin is a "unique motion-capture creation app" [3D World, issue 56] that has been designed to provide high-quality mo-cap data for all the things a mo-cap actor can't do. Not things like intricate dance moves, but stunts like jumping from a twelfth floor window onto a concrete surface, or being hit in the face by a speeding train.

Using a very solid physics engine to generate its results, endorphin creates motion-capture from the movements of a ragdoll actor. But unlike most 3D ragdolls, this one uses biomechanical data to accurately solve the body's movements, making sure joints bend to common human limits and don't flap about like a damp sock. On top of this, endorphin applies Behaviours: actions for the ragdoll to follow as it tumbles through a scene. Behaviours such as 'Arms windmill' or 'Hands covering face' dramatically bring life to the actor and realism to the scene.

But how do you get your actor going? Well, endorphin has three approaches to initial motion. You can start with any existing piece of motion-capture – for example, a run cycle brought in via traditional formats (FBX, BVH, ASF, and so on) – and apply some simple keyframing via a pose-to-pose animation system, or you can simply kick him really hard by using a 'force event'. Just point at the body part you want to hit, set how hard and away he goes. Or if you want to be really clever, you can set up a multi-character scene and have
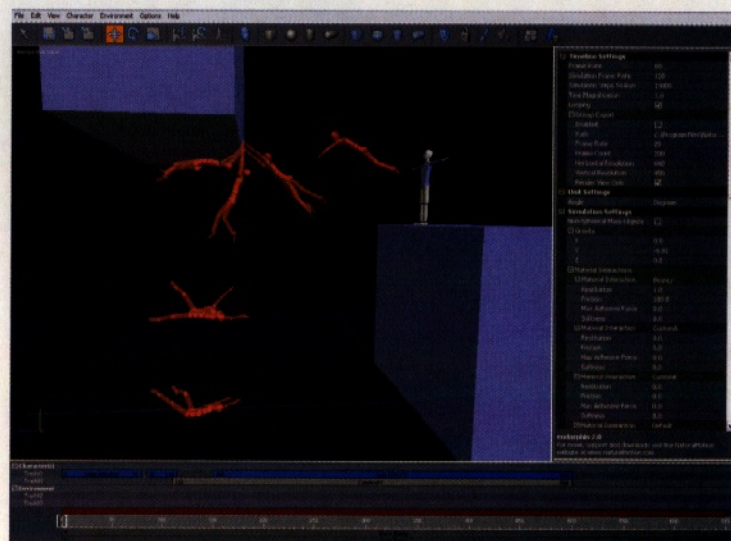
● endorphin's virtual stuntman in action. This Strobe view instantly shows you where the character will leap from, and where he'll fall to, which makes it much easier to plan your scenes

them all smash into each other setting off Behaviours, animations and all sorts of general mayhem.

But these things were also in version 1.6, so what's new in version 2? Well, to begin with, the customisable Behaviours can now be layered to blend in even more variation and complexity to your scenes. Working exactly as you would assume, you just add a new layer, stick on an Arm Windmill, then another layer, then some thrashing legs, and so on until you're done. And that's not all: you can specify which body parts receive each Behaviour too.

In fact, customisation is the key to this release as characters can also be altered – the basic human form of the endorphin ragdoll can be bulked up by attaching

chunks of Collision geometry (perfect for simulating bulky characters, sports pads or suits of armour).

endorphin is ridiculously enjoyable to use; you can lose hours playing with a stuntman, a flight of stairs and various Behaviours. But that's not to say the package is slow – far from it. In fact the millions of calculations required to propel your character over a balcony, bounce off a roof and smash through a table are practically done in real time. Already used in many big-budget movies and games, endorphin is a must for any project requiring high-octane mo-cap data. Yes, it's expensive, but when a two-day mo-cap shoot could cost the same as a full version (not including the doctor's bills) it's money well spent. ●
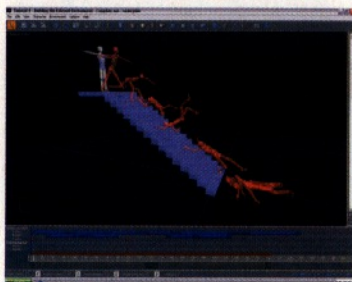
● Behaviours can be layered in endorphin 2 to create more complex movements: in this fall, the stuntman staggers, writhes, then goes stiff

● This example blends between the imported mo-cap data of two boxers and the endorphin-simulated impact of glove meeting face

VERDICT

PROS
• Unique AI-powered virtual Stuntmen
• Fast and easy to use
• Responsive real-time playback

CONS
• No soft body dynamics yet

RANGE OF FEATURES	10
VALUE FOR MONEY	9
OVERALL	**9**

Maestro

It might be slick and production-ready, but will this new automatic character rigging plug-in help you become a LightWave maestro?

BY BENJAMIN SMITH

Maestro is the latest in a series of similar *LightWave* plug-ins that we've seen recently: automated character riggers that promise to take the headache out of rigging and get you up and animating in no time.

Maestro is added as a couple of Lscripts, and then it's as simple as pasting on a default skeleton in Modeller and running the autorig script in Layout. This will then build the skeleton and add all the IK, expressions and control objects. Where *Maestro* differs from rival products – such as Lukasz Pazera's *Auto Character Setup 4 (ACS4)* and Anzovin Studio's *The Setup Machine* – is that you invoke a controller panel and animate the character via a series of joypads that are spread out on an image of the character.

The control panel is slick and professional, but it's likely to be a matter of personal taste with animators, many of whom will prefer the more 'hands on' approach of actually animating 3D control objects. It also takes a little while to figure out what all the joypads do because they aren't 100% intuitive. This means that *Maestro* may be a better choice if you want to perform a large volume of animation with it. It's also totally customisable, so experienced riggers will still be able to rig non-standard creatures and even make control panels for any scene element or setup. ●
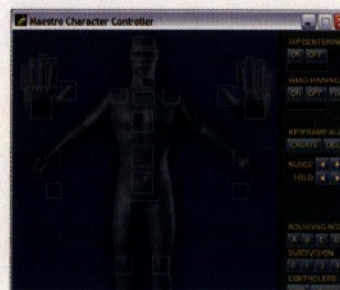
● The control panel where you animate your character – just click and drag in the hotspots

VERDICT

PROS
• Painless character rigging
• High level of pose control

CONS
• Deformations not as good as *ACS4*
• Slightly unintuitive, hands-off animation style

RANGE OF FEATURES	9
VALUE FOR MONEY	8
OVERALL	**8**

Swift 3D LW3

The latest features from Swift 3D have finally migrated into Electric Rain's LightWave plug-in. But have they been worth the wait?

BY SIMON CORNISH

If you've already used the standalone version of *Swift 3D,* you'll appreciate the power of being able to output anything you can create in your main 3D package straight to *Flash*. That power also comes in the form of two newly updated plug-ins: one for *3ds Max* (not covered here), and one for *LightWave*.

Version 3 now incorporates the RAViX 4 render engine, creating snappy renders even with complex scenes and surface grading. It can now apply different settings for various objects within the scene and has a 'two pass curve fitting' option (effectively a form of antialiasing to smooth ragged curves). The plug-in also has a new Pen Outline tool than creates angled strokes, from different nib types, though this could have produced more consistent results on highlighted edges.

Electric Rain has also taken the time to implement additions for coloured shadows, enhanced transparency settings and edge details. *Swift 3D LW3* now has improved support for EPS and SVG output, as well as SWF and *Swift's* own straight-to-*Flash* (SWFT) format. As you would expect from a plug-in like this, it still includes a range of different cartoon and gradient fills.

Although there have been other good cartoon shader plug-ins in the past, *Swift 3D* has stayed the course and is still top of the list for reliable vector output for next-generation media formats. ●

● *Swift 3D LW3*'s control panel is simple, and settings can be saved and re-loaded

VERDICT

PROS
• Significantly faster rendering

CONS
• Can't render polygons with more than four sides
• Unable to recognise non-mesh objects

RANGE OF FEATURES	9
VALUE FOR MONEY	9
OVERALL	**9**

TransPoser 2

The latest version of TransPoser has arrived just in time to ride the Poser 6 publicity wave, but has Eovia missed the tide? **BY MAT BROOMFIELD**

TransPoser gives you the ability to import *Poser* scenes into *Carrara*, allowing you to combine two low-cost 3D packages to produce impressive professional animations. The latest version of *TransPoser* adds very few features (hence the low update price), but more importantly, it's a product out of time, arriving just as the next version of *Poser* hits the shelves, which renders it obsolete.

Although *TransPoser 1* was *Poser 5* compatible, it didn't support *Poser* lighting, dynamic hair animation or procedural textures. This version rectifies two of those inadequacies but procedural textures, one of *Poser 5*'s biggest features, still aren't supported. A small compensation is the fact that the program retains a live link to the

original *Poser* file, so you can make a change in *Poser*, click the Update button and the change is immediately reflected in your *Carrara* scene. If you prefer, you can add textures in *Carrara*, but as soon as you do, the link to the original *Poser* file is permanently severed.

TransPoser 2 is incompatible with *Poser 6* due to the way it links to *Poser*'s executable. Even if you cheat and link to a *Poser 5* exe, advanced *Poser 6* lighting makes *Carrara* crash. Wait until Eovia can figure out how to support procedural textures, and the current program version. ●

● TransPoser 2 imports your *Poser* animations, complete with hair and lighting, into *Carrara 4*

VERDICT

PROS
• Adds hair support to *Poser* import

CONS
• Too little too late
• Eovia still can't do procedural textures

RANGE OF FEATURES	3
VALUE FOR MONEY	7
OVERALL	**6**

DETAILS

PRICE
• Full product
  £107 / $129 / €129
• Upgrade
  £33 / $39 / €39

PLATFORM
PC / Mac

MINIMUM SYSTEM
• Any computer capable of running *Carrara*

MAIN FEATURES
• Import *Poser 4/5* animations to *Carrara 4*
• Link between *Carrara* and *Poser*

DEVELOPER
Eovia

WEBSITE
www.eovia.com

TA Facial Animation

Does this hardcore facial animation suite endorsed by Timothy Albee talk the talk, or does it just roll its eyes and pout? **BY BENJAMIN SMITH**

Timothy Albee's *Facial Animation* does exactly what it says on the tin: it's a specialised application for creating facial animation like that of Tim Albee! It's aimed predominantly at *LightWave* users, so its main selling point is that it offers a speed of productivity that far exceeds what you can do with *LightWave*'s rather clunky slider panel.

When you import a *LightWave* object file, *TAFA* automatically recognises the embedded endomorphs. It then presents you with an interface centred around the face, where you can see all targets in a palette and plot the animation on a Dope sheet. To animate, you arrange morphs into groups and get performance by pushing the mouse around the Morph palette and seeing the results in real time.

However, it's a morph-driven system, so you can't use a bone to animate the jaw or targeting to control the eyes, for example. The other limitation is that you can't see a character in context or in relation to other characters without exporting back to *LightWave*. Given this, it's perhaps a shame

it's done as a stand-alone and not as a *LightWave* plug-in. However, *XSI*, *Maya* and *Max* support is promised in a future update.

You'll be doing quite a lot of facial animation before you want to invest the time in learning a new app, but *TAFA* is as painless to learn as you can imagine. ●

● Although the *TAFA* interface has a lot of floating windows, it still remains streamlined

VERDICT

PROS
• Painless character rigging
• High level of pose control
• Slick and production ready

CONS
• Slightly unintuitive, hands-off animation style

RANGE OF FEATURES	9
VALUE FOR MONEY	8
OVERALL	**8**

DETAILS

PRICE
£270* / $495 / €394*
*Currency conversion

PLATFORM
PC

MINIMUM SYSTEM
• Windows 2000 or higher with OpenGL
• *LightWave 7.5* or higher

MAIN FEATURES
• Full support for *LightWave* endomorphs
• Puppeteer with Morph Palette

DEVELOPER
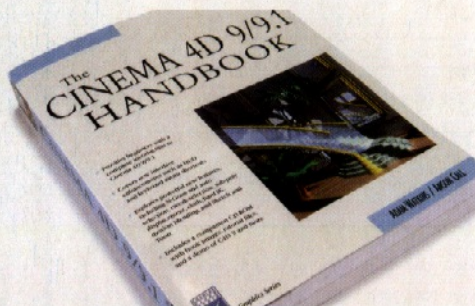Mac Reiter Creations

WEBSITE
www.macreitercreations. com

DETAILS

AUTHOR
Adam Watkins and
Anson Call

PUBLISHER
Charles River Media

PRICE
£30 / $54* / €44*
(* Currency conversion)

PAGES
500

ISBN
1-58450-402-1

The Cinema 4D 9/9.1 Handbook

Designed primarily for beginners, this book handholds new users through the basics of C4D, introducing modelling, texturing, lighting and then moving on to the more complex issues of boning, IK, animation and so on.

On balance, though, the book probably tries to do too much. As an introduction to C4D and 3D, it would be better to have comprehensive coverage of all the modelling, texturing and rendering tools, and leave things like boning and IK for another volume. After all, the book only just covers the basics of subdivision surfaces, before you're thrown into the rigging of an animated character – arguably, not one of C4D's strengths.

The simple truth is that, like most of today's all-in-one 3D packages, there's really too much in Cinema 4D to be comfortably covered in one book and this alone is its greatest failing.

VERDICT
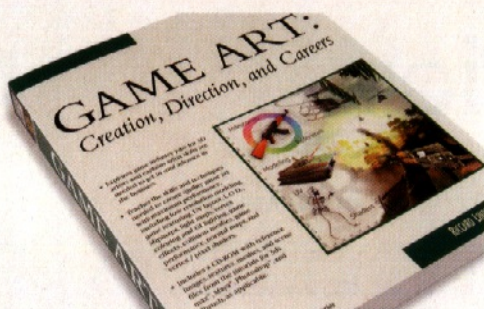A decent introduction to C4D, but with some odd editorial inclusions and omissions **7**

DETAILS

AUTHOR
Riccard Linde

PUBLISHER
Charles River Media

PRICE
£30 / $54* / €44*
(* Currency conversion)

PAGES
350

ISBN
1-58450-395-5

Game Art: Creation, Direction and Careers

As we enter a new generation of videogaming hardware, with its high-res, hyper-real graphics, the call for new artists will be louder than ever. But the biggest problem is that most 'traditional' 3D artists or animators have no real grasp of what's required in the videogame industry and how best to create a convincing CV.

This book endeavours to fill the gap in an artist's knowledge with a detailed exploration of subjects such as efficient UV mapping, optimised mesh creation, modelling for level-of-detail, real-time lighting and so on. Boasting full colour throughout, plus an accompanying CD of apps, plug-ins and example files, Game Art presents a solid, no-frills approach to the subject. But coming from the art director of Digital Illusions, all the examples are of DI games (Battlefield 1942, Battlefield Vietnam) and, as such, there's a rather monotone, military theme to proceedings.

VERDICT
A complete guide to videogame asset creation. Thorough in its approach and well presented **8**
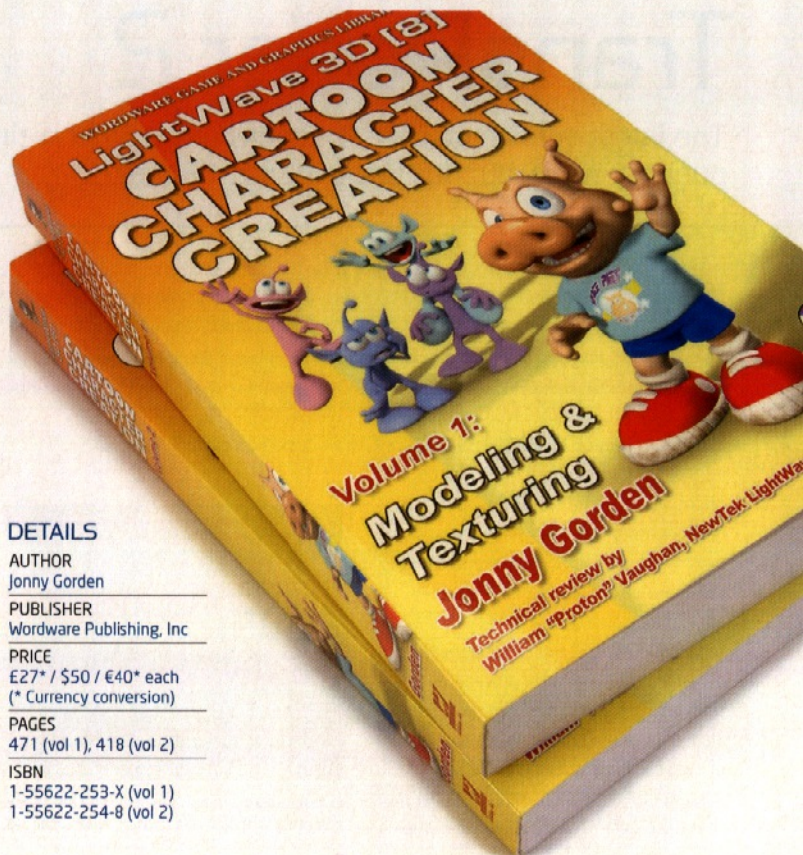
DETAILS

AUTHOR
Jonny Gorden

PUBLISHER
Wordware Publishing, Inc

PRICE
£27* / $50 / €40* each
(* Currency conversion)

PAGES
471 (vol 1), 418 (vol 2)

ISBN
1-55622-253-X (vol 1)
1-55622-254-8 (vol 2)

LightWave 3D [8] Cartoon Character Creation vols 1 & 2

This two-book set by animator Jonny Gorden is a comprehensive, step-by-step, guide to the creation, texturing, rigging and animation of characters in LightWave 8. As such, it's not to be approached lightly - there are certainly no quick-fix solutions here and there's little attempt at levity.

Volume 1 goes into the process of modelling a character, with emphasis on things like cleanliness of mesh, weight maps, morph maps and the general setting up of a model prior to animation. The book is split across two separate sections, the first of which acts as an introduction to basic modelling principles, crafting a simple mesh character with its own rig. The greater part of the book is taken up by a more complex model involving more detail, a greater range of movement and UV texture mapping.

Volume 2 takes this latter model (a piggy character called Hamish) and guides the reader through the complex task of creating phoneme morph targets for lip-synching, setting up weight maps, adding IK goals, managing joint mechanics, using expressions and even adding hard-body dynamics. And yes, it's as scary as it sounds; Gorden doesn't dress it up or attempt to cut corners. This is pretty hardcore stuff.

Overall, Gorden's work represents probably the best source of advice on character creation, rigging and animation for LightWave. With the majority of the accumulated 800+ pages consisting of traditional screengrabs-and-captions (in black and white, no less), it's not exactly light reading, but the information contained within is invaluable, making it an indispensable addition to the LightWave animator's armoury and a reference benchmark. It's just a shame that the printing is so poor all the screengrabs have to be replicated on the CD.

VERDICT
A remarkable treatise on LightWave animation that's not for the fainthearted... **9**
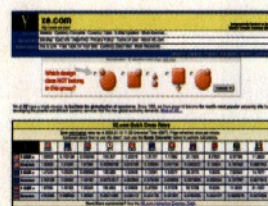
IN ISSUE 151:

THE NEXT GENERATION

ON SALE JUNE 10

Buyers' guide

Whether you want advice on choosing a specific software package, or an overview of what's on the market, this database of past 3D World reviews contains the information you need to make the right buying decision

When new 3D users contact the magazine, the most common question they ask is: "Which software package should I buy?" To which the honest response is: "That really depends on you."

Unlike Web design or 2D illustration, there's no single, well-established software package that all professionals use. Instead, choosing a 3D application is largely a matter of personal requirements, not to mention individual taste. Before you begin downloading demos, however, it does help to have a broad overview of what's available – and that's where this buyers' guide comes in.

In this guide, you'll find a list of the key software packages in a particular market sector, the issue of the magazine in which each one featured and a brief summary of the review. These summaries represent a single reviewer's opinion, but they should give you an idea of the key characteristics of each application.

QUESTIONS, QUESTIONS...

Before diving in, there are two fundamental questions you should ask. Firstly, are you pursuing 3D as a professional career? And secondly, what kind of 3D work do you aim to produce?

If the answer to the first question is 'no', the only limitations on your choice of 3D software are your budget and operating system. In the hands of a skilled user, inexpensive applications can generate impressive results, although they might not do so as quickly as more expensive software (or in a way that professional 3D artists would deem conventional).

If you do aim to make a living in 3D, however, you'd be well advised to pick a 'professional' application: those listed in the upper table on the page opposite. Expensive packages don't necessarily generate better results, but they tend to produce work quickly,

flexibly and reliably – all important issues if deadlines are looming. And while studios don't usually hire staff solely on the basis of the software they've used, mastering a 'name' application will familiarise you with high-end tools and increase your chances of freelance work.

Another consideration is whether you intend to produce animations or still images. As a crude generalisation, illustrators and graphic artists often favour pro applications at the lower end of the price scale, while those working in animation, visual effects or game design tend to opt for more expensive packages.

Ultimately, however, there's no substitute for hands-on experience. All major applications have demo versions that you can

CHOOSING APPLICATIONS IS ALL ABOUT PERSONAL REQUIREMENTS AND INDIVIDUAL TASTE

download and experiment with, and before you reject the more expensive packages, remember that many of them – particularly *Maya*, *Houdini*, *LightWave* and *Softimage|XSI* – have free 'learning' editions. Educational deals also offer students the chance to buy full versions of professional software for the price of a handful of DVDs: to see if you qualify, check the website of the software package you're interested in.

Fortunately, there are very few 'bad' 3D packages on the market, so choosing the right one for you ultimately comes down to personal taste. Do your research, consult the magazine, and be prepared to experiment – but above all, enjoy yourself!

Online Resources

● This guide lists prices in Pounds Sterling and US Dollars. For a quick currency conversion: **www.xe.com**

● For non-3D software, our new online portal holds a wide range of reviews: **www.3dworldmag.com**

ALL-ROUND 3D PACKAGES (UNDER £250)

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AIST MOVIE 3D	PC	Cut-down version of *Realsoft 3D*, aimed mainly at home movie makers dabbling in 3D	£68* ($132*)	AIST	www.aist.com	N/A	[Not previously reviewed in *3D World*]	N/A
CARRARA 3D BASICS	Mac/PC	Extremely stripped-down version of a mid-price app, aimed at hobbyists and casual users	£39 ($49)	Eovia	www.eovia.com	N/A	[Not previously reviewed in *3D World*]	N/A
CARRARA 4 STANDARD	Mac/PC	Inexpensive all-rounder, lacking some of the high-end tools from *Carrara 4 Professional*	£209 ($279)	Eovia	www.eovia.com	60	Still a solid purchase for a novice all-round 3D user on a budget, *Carrara 4* fixes bugs from earlier versions, but lacks the new rendering tools of the *Pro* edition	8
GAMESPACE	PC	Cut-down *trueSpace* with extra games tools: aimed at modders and indie game developers	£154* ($299)	Caligari	www.caligari.com	46	Goes some way to providing a one-stop solution for the mod community, but one with rough edges on release: those on a real budget may stick to freeware	7
HASH ANIMATION:MASTER	Mac/PC	Cult entry-price animation app: chosen by many leading animators for personal work	£154* ($299)	Hash Inc.	www.hash.com	59	Powerful, intuitive rigging and animation package, complemented by a simple, versatile modeller. Now adds hair support and a sprite-based particle system	9
PIXELS 3D 5	Mac	The premier – and possibly, only – Mac-only 3D package: a cult app amongst Mac fans	£77* ($149)	Pixels Digital	www.pixelsdigital.com	42	Great value for money, and includes a number of high-end tools, including fluids and cloth. Good render quality, but very slow, and workflow could be improved	8
REALSOFT 3D 4.5 (FOR LINUX)	Linux	Even better value than the PC edition: most Linux users' main alternative to freeware	£140* ($270*)	Realsoft Graphics	www.realsoft.com	35	Excellent render quality for the price, but more suited to still images than animation work, particularly character animation. OpenGL could be improved	9
SHADE 7 DESIGNER LE	Mac/PC	Very inexpensive, if limited, all-round package: extremely popular with hobbyists in Japan	£56* ($109)	Curious Labs	www.curiouslabs.com	58	Clearly geared towards the student or amateur, this cheap and cheerful version of its bigger siblings shares the basic modelling tools but is otherwise limited	7
SHADE 7 STANDARD	Mac/PC	Mid-level edition: more expensive than LE, but lacks some key tools of *Shade 7 Pro*	£107* ($209)	Curious Labs	www.curiouslabs.com	58	Similar in toolset to the *Professional* edition, but lacks automatic smoothing and interpolation. A reasonable buy, if you can handle the translation issues!	7

ALL-ROUND 3D PACKAGES (OVER £250)

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3DS MAX 7.5	PC	Long-established 3D package: still a standard in the games and architecture industries	£2,695 ($3,495)	Autodesk	www.autodesk.com	66	A solid point-five upgrade, although only available to subscribers, 3ds Max 7.5 adds hair and fur, architectural features and better mental ray rendering	8
CARRARA 4 PRO	Mac/PC	Inexpensive all-round app, now targeted more specifically at professional illustrators	£419 ($579)	Eovia	www.eovia.com	60	Retains Eovia's unique – and possibly offputting – system of workflow divided between 'rooms', but dramatically improves animation and high-end rendering	8
CINEMA 4D 9 BASE	Mac/PC	Entry-level edition only: some important tools must be purchased as add-on modules	£425 ($695)	Maxon	www.maxon.net	58	Not as ground-breaking an upgrade as version 8, but builds on previous incarnations to deliver a capable all-round professional 3D package	9
CINEMA 4D 9 XL	Mac/PC	A powerful renderer makes this increasingly respected app the choice of many illustrators	£1,148 ($1,895)	Maxon	www.maxon.net	58	[This edition not specifically reviewed in 3D World] Pricier than Lightwave, but the MOCCA and Advanced Render modules are essential to many pro artists	9
CINEMA 4D 9 STUDIO	Mac/PC	Top level edition of Cinema 4D, adding in BodyPaint 2 and unlimited network rendering	£1,871 ($2,995)	Maxon	www.maxon.net	58	[This edition not specifically reviewed in 3D World] Primarily for large facilities needing unlimited render licenses, although BodyPaint is a useful added extra	9
EIAS 5.5	Mac/PC	Perennial professional-quality animation package with a strong cult following	£463* ($895)	EI Technology Group	www.eitechnologygroup.com	59	Still an insanely fast rendering and animation package, but now minus a built-in modeller since the last – admittedly thorough – point-five upgrade	8
HOUDINI 7 SELECT	PC/Linux	Entry level edition, primarily aimed at studios looking to build a lower-cost Houdini pipeline	£825* ($1,599)	Side Effects Software	www.sidefx.com	25	[Reviewed at version 5] A good additional seat for a Houdini studio, but lack of advanced and character animation tools limit its use as a standalone package	7
HOUDINI 7 MASTER	PC/Linux	Powerful procedural animation package: few skilled users, but a staple of much VFX work	£8,769* ($17,000)	Side Effects Software	www.sidefx.com	41	[Reviewed at version 6] Retains all the power of previous versions, but makes considerable advances in terms of ease of use. Also adds GI rendering	8
LIGHTWAVE 3D 8	Mac/PC	Another long-established package, used in a wide range of work, notably TV effects	£995 ($1,595)	NewTek	www.newtek.com	53	Vastly improves character animation and dynamics, and streamlines workflow, but leaves the renderer and underlying structural problems of the app untouched	8
MAYA 6.5 COMPLETE	Mac/PC/Linux	Lacks some high-end tools, but an affordably priced edition of Maya for many 3D markets	£1,499 ($1,999)	Alias	www.alias.com	64	Still the one to beat in many fields of 3D, but although much faster and slicker, many felt that Maya's last point-five upgrade lacked that elusive 'wow' factor	7
MAYA 6.5 UNLIMITED	Mac/PC/Linux	Powerful all-round package: still the one to beat when it comes to film effects work	£4,899 ($6,999)	Alias	www.alias.com	64	Slicker rendering in mental ray, but it's not exactly a perfect upgrade – it feels like half an improvement. Artists on a budget may want to wait for Maya 7	7
REALSOFT 3D 5 (FOR PC)	PC	Underpublicised, but well-regarded, mid-priced application: good built-in renderer	£415* ($795*)	Realsoft Graphics	www.realsoft.com	61	Enhanced Sub-D modelling and texturing make this a viable alternative to better-known 3D illustration apps. Still weak at character animation, however	9
SHADE 7 PRO	Mac/PC	Very popular Japanese package. Still relatively unknown in the West, but may gain ground	£521* ($1,009)	Curious Labs	www.curiouslabs.com	58	Robust modelling tools and a reasonably powerful renderer, but the interface and animation tools will seem unconventional to many Western 3D artists	7
SOFTIMAGE|XSI 4 FOUNDATION	PC/Linux	Aggressively marketed entry-level edition of a leading 3D app: very powerful for the price	£299 ($495)	Softimage	www.softimage.com	55	Fuller featured than many entry-level editions of major packages, Foundation – originally sold for $1,995 – sets a new benchmark for 3D software pricing	9
SOFTIMAGE|XSI 4 ESSENTIALS	PC/Linux	Powerful, well-balanced all-round package, also much reduced in price over the last year	£1,275 ($1,995)	Softimage	www.softimage.com	55	A solid upgrade to a powerful package, adding new rigid body dynamics, a fully non-linear modelling workflow and improved texturing and materials tools	9
SOFTIMAGE|XSI 4 ADVANCED	PC/Linux	Widely used in games and VFX, but struggles for market dominance with 3ds max and Maya	£4,485 ($6,995)	Softimage	www.softimage.com	55	For power users, XSI 4 Advanced also throws in BatchServe and eight satellite render licences for free. Still no decent NURBS or curve tools, though!	9
STRATA 3D CX	Mac/PC	Long-established, if relatively niche, mid-price 3D package: now targeted at illustrators	£346* ($695)	Strata	www.strata.com	55	A capable, if idiosyncratic, package for a print graphic artist looking to team Photoshop and Illustrator with a little 3D. Far weaker for animation, however	7
TRUESPACE 6.6	PC	Another fixture in the increasingly crowded mid-price 3D software market, still widely used	£310* ($595)	Caligari	www.caligari.com	38	Improving animation and dynamics, version 6.6 addresses many of trueSpace's shortcomings, but the current interface now looks to have reached its limits	8

TEXTURING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
BODYPAINT 3D 2	Mac/PC	Powerful specialist 3D painting package, used on increasingly high-profile VFX projects	£425 ($745)	Maxon	www.maxon.net	47	Much quicker and simpler to use than the first release, and results can be stunning. Rock solid and well documented, but one for specialist texture artists	9
DEEP PAINT 3D 2	PC	Established 3D painting app, but not recently updated, and losing headlines to BodyPaint	£307* ($595)	Right Hemisphere	www.righthemisphere.com	26	Powerful, but RAM-hungry, and advanced mapping tools are presented in a separate app, Deep UV. Not recently updated, however, unlike BodyPaint 3D	8
PAINT SHOP PRO 9	PC	Inexpensive 2D painting and bitmap editing app, unfairly regarded as 'just for hobbyists'	£99.95 ($129)	Corel	www.corel.com	57	Fantastic value for money, and version 9 adds a proper History palette. Does nearly anything that Photoshop can, but needs better Alpha channel support	9
PHOTOSHOP CS	Mac/PC	The de facto standard for texture painting and image manipulation amongst CG artists	£515 ($649)	Adobe	www.adobe.com	48	Still de rigeur for professional 3D work. Few must-have features for 3D users in the latest release, but integrated photo-stitching and Match Colours are handy	8

TALKING POINT | Why use commercial 2D software at all?

AFTER OUR COVERAGE of the open-source 3D package *Blender* last issue, we felt it was time to look at a similar free alternative to commercial 2D image-manipulation software. Although not as widely used as *Blender*, the *GNU Image Manipulation Package* (or *GIMP* for short) does have a healthy following, particularly among Linux users. The *GIMP* comes with a standard basic feature set (including full support for layers and Alpha channels) and relatively low mimimum system requirements (128MB RAM, Windows 98 or most flavours of Linux, but Mac OS X only). Tutorial support is less extensive than *Blender*, and some *Photoshop* users find the GUI clunky, but the *GIMP* is capable of good results for those on a limited budget. **www.gimp.org**

MODELLING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AMAPI DESIGNER 7	Mac/PC	Long-established modelling package, boasting a unique workflow and interface	£339 ($479)	Eovia	www.eovia.com	40	A powerful modelling package, particularly for organic objects, although users will either love or loathe the interface, and documentation could be improved	9
AMAPI 7.5 PRO	Mac/PC	Amapi Designer's new bigger sibling, intended as a serious alternative to pricier applications	£559 ($779)	Eovia	www.eovia.com	62	Professional version of Amapi aimed at industrial modelling. Awesome Dynamic Geometry and better NURBS modelling but tool/command validation is tricky	9
AMORPHIUM 3	Mac/PC	Blob-based modelling package: very popular with hobbyists, but not recently updated	£76* ($149)	El Technology Group	www.eitechnologygroup.com	35	A unique organic modelling package: only basic Sub-D tools, a slow renderer and a rather clunky interface, but what it does do, it does extremely well	8
FORM•Z 5	Mac/PC	Powerful, long-established all-round modeller, used on a wide range of industrial projects	£794* ($1,495)	Auto•des•sys	www.formz.com	63	This is a premium modelling package – a hybrid solid and surface modeller. With strong NURBS tools and decent renderer, it has a steep learning curve	8
MODO	Mac/PC	Powerful, customisable and Mac-friendly new Sub-D modeller, created by ex-NewTek staff	£359* ($695)	Luxology	www.luxology.com	60	A relatively pricey addition to a crowded market sector, but one with a uniquely customisable modular design. Some early stability issues, but improving rapidly	8
RHINO 3	PC	Another well-established app: at the lower end of the price scale for industrial modellers	£462* ($895)	Robert McNeel & Associates	www.rhino3d.com	36	New NURBS tools and shading modes make this package a strong all-rounder. Will soon need upgrading to keep pace with newer competitors, however	8
SILO	Mac/PC	New specialist Sub-D modelling package: inexpensive, and improving with every build	£56* ($109)	Nevercenter	www.nevercenter.com	55	Has evolved into a promising app, following early stability issues. Quirky UV mapping, but good crossover between Sub-D and poly tools, and customisable	9
ZBRUSH 2	Mac/PC	Powerful, intuitive organic modelling package currently gaining very strong word of mouth	£252* ($489)	Pixologic	www.zbrush.com	53	A new interface helps redefine ZBrush 2 as a professional 3D sculpting tool. Still some quirks, but many unique tools and capable of handling millions of polys	9

TALKING POINT | Do we need a new Sub-D modeller?

MODO. SILO. AMAPI. The market for dedicated polygonal/subdivision modelling packages is already a crowded one. To which list, we can now add *Hexagon*. Developer Eovia claims its new app's unique selling points are a shallow learning curve, and the ease with which different modelling techniques can be combined. But has *Hexagon* got what it takes to survive in such a cutthroat sector? *Hexagon* **is reviewed on page 90**

CHARACTER AND FACIAL ANIMATION

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
DAZ|STUDIO	Mac/PC	Long-awaited new rival to Poser, currently still available as a free public beta	Free	DAZ Productions	www.daz3d.com	N/A	[Not previously reviewed in 3D World]	N/A
ENDORPHIN 1.6	PC	Innovative 'motion-synthesis' system using AI 'actors' to generate artificial mo-cap data	£7,995 ($12,975)	NaturalMotion	www.naturalmotion.com	56	Brilliant: technically accomplished, and fun to use, to boot. Generates data no real world stuntman could achieve, and now supports multiple characters	9
FACESTATION 2	PC	Turn video footage of an actor's face into instant animation: for 3ds max and Maya	(£1,041* $1,995)	Digimation	www.digimation.com	33	Fast facial tracking, and can work with real-time capture. Resource hungry, however, and the quality of the results is only as good as your morph targets	8
LIFESTUDIO:HEAD 2.5 STANDARD EDITOR	PC	Customise a pre-built head model, apply instant lip synch and export as OBJs or an AVI	£310 ($599*)	LifeMode Interactive	www.lifemi.com	44	Good texturing tools, but some tweaking is required to finesse the lip synch generated automatically from an audio track. Manual and UI need tidying up	8
LIFESTUDIO:HEAD 2.5 PRO ARTIST	PC	Create and rig facial models for 3ds max and Maya, then apply instant lip-synching	£990 ($1,914*)	LifeMode Interactive	www.lifemi.com	44	As the Standard Editor, but with the power to import/export directly to Maya or 3ds max. One of the first proper tools of this kind: a time-saver for games artists	8
MESSIAH:ANIMATE 5	PC	Powerful standalone animation package, also available as a plug-in for major 3D packages	£125* ($239)	pmG Worldwide	www.projectmessiah.com	29	[Reviewed at version 3] A comprehensive character animation solution with very fast IK and deformation and powerful expressions. Now reduced in price	8
MESSIAH:STUDIO 2	PC	messiah:animate's larger parent product, adding in full rendering capabilities	£518* ($995)	pmG Worldwide	www.projectmessiah.com	58	Not an industry-standard application (and lacks modelling tools), but offers intuitive, fast and powerful GI rendering and is capable of some amazing results	7
MOTIONBUILDER 6 STANDARD	Mac/PC	Innovative 'motion design' package, originally developed by Kaydara: now owned by Alias	£532* ($995)	Alias	www.alias.com	46	[Reviewed at version 5] Powerful FK/IK blending and real-time playback, plus a new Story Window to keep things organised. Quickly becoming indispensable	9
MOTIONBUILDER 6 PRO	Mac/PC	Pro motion-editing app: an industry standard for blending mo-cap and keyframe data	£2,244* ($4,195)	Alias	www.alias.com	62	High-end tools include mo-cap data editing and data retargeting. It might be a tad expensive, but it's probably the best character animation tool around	8
POSER 6	Mac/PC	The original figure-posing application, also used for pre-viz and simple animation work	£157 ($249)	Curious Labs	www.curiouslabs.com	65	Despite a few niggles, well-chosen workflow enhancements and a lot of new content make Poser 6 a vital upgrade. Still undisputed champ in its market sector	8

RENDERING (packages previously reviewed in 3D World only)

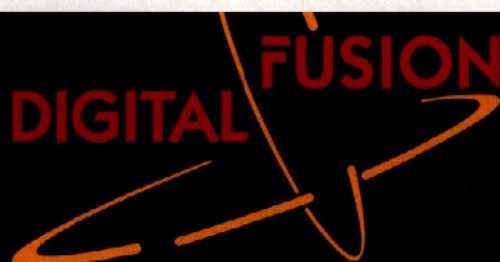| PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
ART•LANTIS 4.5	Mac/PC	Old-school architectural rendering package, now awaiting an update to version 5.0	£349	Abvent	www.abvent.com	13	This interactive package is capable of high-quality results and provides decent renders quickly, without fuss. Few fine controls, though, and not recently updated	7
BRAZIL R/S	PC	Powerful 3ds max renderer, used in both stills and effects work: soon to be ported to Maya	£617* ($1,200)	SplutterFish	www.splutterfish.com	31	Fast and robust, with an excellent shader system, delivering high-quality results. Bucket rendering allows fast distributed rendering across a network	9
FINALRENDER STAGE-1	PC	Another powerful 3ds max renderer, often used in architectural visualisation work	£415* ($795)	Cebas	www.finalrender.com	43	Powerful new HyperGI engine and caustics tools, but exceptional results require a lot of tweaking. Some instabilities, particularly in distributed renders	7
TURTLE	Mac/PC/ Linux	Third party Maya renderer, designed to offer a new balance of speed and image quality	£619* ($1,199)	Illuminate Labs	www.illuminatelabs.com	55	Blisteringly fast raytrace rendering. Currently best suited to architectural work due to lack of support for particles and Paint Effects, but developing rapidly	7

LANDSCAPE GENERATION

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
BRYCE 5	Mac/PC	The original landscape generator: now back in development after several years in limbo	£46* ($89.95)	DAZ Productions	bryce.daz3d.com	16	Often dismissed as a toy for hobbyists, Bryce is easy to use and renders at high quality. Good for photorealistic backgrounds, even with a slow renderer	8
MOJOWORLD 3	Mac/PC	Unusual landscape-generation app with a unique emphasis on creating entire planets	£103* ($199)	Pandromeda	www.pandromeda.com	60	A unique approach to landscape generation that will divide users. Some great tools, but hard to control fine details and the interface can be frustrating	6
VUE 5 ESPRIT	Mac/PC	Landscape generation's current market leader: high-quality results at an affordable price.	£171 ($249)	e-on Software	www.e-onsoftware.com	50	Rightly the best-selling landscape generator: very realistic results, and easy to master. New GI rendering is slow, however, and still no proper animated water	9
VUE 5 PRO STUDIO	Mac/PC	The Vue 5 Esprit core, augmented by four add-on modules (also purchasable separately)	£274 ($399)	e-on Software	www.e-onsoftware.com	65	A well-rounded set of add-ons. Although some features should arguably be in the core app, Mover (Poser import) and Botanica (plant editing) are of real value	8
VUE 5 INFINITE	Mac/PC	Pro-level edition of Vue, aimed at architectural and VFX work. Formerly known as Vue 4 Pro	£411 ($599)	e-on Software	www.e-onsoftware.com	66	Powerful, intuitive and configurable, Vue 5 Infinite leads where other landscape apps dare not follow. Relatively pricey, but capable of incredible-quality results	8
WORLD CONSTRUCTION SET 6	Mac/PC	Technical, but very powerful package: well suited to tasks requiring real-world accuracy	£256* ($500)	3D Nature	www.3dnature.com	13	[Reviewed at version 5] A versatile and comprehensive landscape program, but the interface is unintuitive with a steep learning curve and no simple mode	8
WORLDBUILDER GENESIS	PC	A popular alternative to the Vue family: more powerful than Bryce, less technical than WCS	£92* ($179)	Digital Element	www.digi-element.com	57	Beautiful end results, and fairly easy to use. Now very much optimised for 3ds max, though, while some of the new features and the tutorials lack polish	7
WORLDBUILDER PRO 4	PC	Higher-end edition of WorldBuilder, tailored to pro graphics artists rather than hobbyists	£360* ($699)	Digital Element	www.digi-element.com	57	A terrific program with many unique features, particularly for plant and water animation, and great user control over fine detail – but see reservations above	7

COMPOSITING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AFTER EFFECTS 6 STANDARD	Mac/PC	One of the most popular desktop compositing packages, usable even for broadcast work	£565 ($699)	Adobe	www.adobe.com	47	Updated video painting features, plus the addition of Photoshop's Liquefy tool make for a major upgrade. Still the same cluttered old interface, however	8
AFTER EFFECTS 6 PROFESSIONAL	Mac/PC	As After Effects Standard plus some high-end tools: worth investing in for professional work	£915 ($999)	Adobe	www.adobe.com	47	Motion tracking, enhanced keying and masking, particle systems and 16-bit colour tools make this a better option than AE Standard for serious 3D work	8
COMBUSTION 4	Mac/PC	Autodesk's own desktop compositor: unsurprisingly often teamed with 3ds Max	£850 ($995)	Autodesk	www.autodesk.com	65	Very strong basic tools, well organised workflow and good compatibility with 3D apps, but poorer editing app integration and a relatively steep learning curve	9
DFX+ 4	PC	Cut-down, modular version of Digital Fusion, much beloved of PC-based LightWave artists	Priced by module	eyeon Software	www.eyeonline.com	43	Most of the improvements in version 4 are cosmetic, but still a powerful, affordable, node-based compositing app. Good visual effects and 3D tools	8
DIGITAL FUSION 4	PC	One of the first PC-based desktop compositing packages, but still relatively little known	£2,579* ($4,995)	eyeon Software	www.eyeonline.com	43	Not limited to 8-bit colour space, unlike DFX+, making this a powerful – and underrated – PC-based compositor, capable of scaling to film-quality work	8
SHAKE 3.5	Mac/Linux	Powerful node-based desktop compositor, used even in film and broadcast effects	£2,099 ($2,999)	Apple	www.apple.com	54	The most powerful desktop compositor on the market, with the possible exception of Digital Fusion. Version 3.5 adds long-awaited morphing tools	8

CAMERA TRACKING AND MATCH MOVING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3D-EQUALIZER 3	Mac/Linux	Venerable (and Oscar-winning) tracking package, still widely used in film effects	On request	Science-D-Visions	www.3dequalizer.com	N/A	[Not previously reviewed in 3D World]	N/A
BOUJOU 3	Mac/PC/ Linux	One of the first major alternatives to 3D-Equalizer, popular in the effects world	£5,190* ($10,000)	2d3	www.2d3.com	64	Version 3 is still a powerful tracking package, but this much-delayed and largely unsurprising update may prove a disappointment to long-term boujou users	6
BOUJOU BULLET	Mac/PC/ Linux	Cut-down, wizard-driven version of boujou, intended for small to medium-sized facilities	£1,307* ($2,500)	2d3	www.2d3.com	64	Aimed at smaller post facilities, bullet has good basic 2D and 3D tracking and accepts any resolution footage, but can prove unreliable with zoom shots	7
MATCHMOVER PRO 3.1	Mac/PC/ Linux	Another of the old guard of desktop tracking applications, recently reduced greatly in price	£2,062* ($3,500)	RealViz	www.realviz.com	63	A highly evolved version of the software, with powerful 2D and 3D tracking tools. No optical flow facility, however, and the mo-cap module costs a lot extra	7
PFHOE	Mac/PC	A powerful low-cost DV tracking application, named by 3D World readers (see issue 61)	£49 ($94*)	The Pixel Farm	www.thepixelfarm.co.uk	62	With fast and robust auto-tracking, PFHoe is great value for money and ideal for its target audience of aspiring digital filmmakers and independent artists	9
PFMATCH	Mac/PC	PFTrack's younger sibling, offering a useful range of tracking tools at an entry-level price	£600 ($1,160)	The Pixel Farm	www.thepixelfarm.co.uk	57	Great price, although only broadcast-resolution footage in AVI and QT formats is supported. Good user control in version 1.5, but no proxy-resolution tracking	8
PFTRACK 3	Mac/PC	First of a new generation of lower-priced broadcast-quality camera tracking packages.	£3,000 ($5,000)	The Pixel Farm	www.thepixelfarm.co.uk	66	Fast, powerful, and now boasting true object tracking, PFTrack 3 is arguably the most complete, and completely useful, tracking system currently available	9
SYNTHEYES	PC	Astonishingly affordable new all-round tracking package, gaining good word of mouth	£180* ($349)	Andersson Technologies LLC	www.ssontech.com	49	An incredible range of tools for the price. Outperforms costlier rivals on many tasks, but workflow can feel counter-intuitive for those used to other apps	9

WEB 3D AND MULTIMEDIA

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
ANARK STUDIO 3	PC	Established authoring package for interactive 3D presentations	£1,835* ($3,499)	Anark	www.anark.com	64	A powerful solution for large-scale, real-time 3D, but the new higher price and absence of Mac support will leave some existing users high and dry	8
AXELEDGE 2	Mac/PC	All-in-one authoring and online animation package, described as 'like Flash in 3D'	£309* ($595)	MindAvenue	www.mindavenue.com	33	Powerful all-round authoring package, with good animation and interaction editing tools. Import and export options much improved since version 2.0	8
CULT3D	Varies	Free software suite for exporting 3ds max and Maya models in interactive online format	Free	Cycore	www.cycore.com	12	[Reviewed using the 3ds max exporter] Relatively straightforward to use, with a good range of options in the exporter. Very much more stable in recent builds	7
DIRECTOR MX 2004	Mac/PC	De facto standard for authoring multimedia CDs/DVDs; now incorporating simple 3D tools	£809 ($1,099)	Macromedia	www.macromedia.com	37	Greatly improved layout, but few new 3D tools since version 8.5. Havok physics and useful Web output tools, but programming needed for complex effects	7
QUEST3D 2.1 ENTERPRISE	PC	Real-time 3D authoring tool, also available in cheaper Lite and Professional editions	£1,035* ($1,999)	Act-3D	www.quest3d.com	48	Full-featured all-round authoring app, but fairly easy to master: no programming required. Can become unmanageably cluttered on complex projects, though	8
SWIFT 3D 4	Mac/PC	3D to vector graphics conversion tool: one of the most regularly updated interactive 3D apps	£97* ($189)	Electric Rain	www.swift3d.com	56	No major new tools, but several key usability tweaks see this 3D-to-Flash app maturing as a package. Generates simple animations quickly and painlessly	9
WIREFUSION 4 ENTERPRISE	Mac/PC/ Linux	Visual authoring tool for interactive 3D content: also available in cheaper editions	£1,195 ($1,995)	Demicron	www.demicron.com	56	Straightforward all-round authoring solution: no need for programming or specialist plug-ins to view output. Slightly unorthodox, but quick to master	8

OTHER TOOLS

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3D S.O.M.	PC	Image-based modelling software: one of the newer, less expensive additions to the market	£299 ($582*)	Creative Dimension Software	www.3dsom.com	43	Requires photos of an object against a marker grid like D Sculptor or iModeller, but offers greater automation and can use uncalibrated images for texturing	8
D JOINER	PC	Photo-stitching software: less widely known than Stitcher, but suitable for many projects	£300 ($575*)	D Vision Works	www.d-vw.com	20	In good hands, it does what it's meant to do. But it suffers from a lack of auto-features and poor usability. Documentation is disappointingly slim, to boot	7
D SCULPTOR 2 STANDARD	PC	Image-based modelling software: another mid-priced package, aimed at home users	£500 ($960*)	D Vision Works	www.d-vw.com	11	[Reviewed at version 1] A good tool for creating 3D models from images, and cheaper than ImageModeler. Much slower and not as powerful, however	8
DEEP EXPLORATION 3.5	PC	File-conversion software: capable of tackling a wide range of file formats, including CAD	£77* ($149)	Right Hemisphere	www.righthemisphere.com	45	Well-designed model viewer, file conversion and asset-management utility. Includes basic 3D model editing tools, rendering and Shockwave output	8
FRAMEFORGE 3D STUDIO	Mac/PC	Storyboarding software: first of a new wave of apps aimed at previz and 3D storyboarding	£180* ($349)	Innoventive Software	www.frameforge3d.com	55	Extremely easy to use, and scales to even high-budget movies. Specialised props only available as add-on packs, though, and complex scenes can be sluggish	9
IMAGEMODELER 4	Mac/PC	Image-based modelling software: one of the earliest desktop photogrammetry packages	£712* ($1,380)	Realviz	www.realviz.com	59	Gives professional-quality results, and can cope with architectural-sized objects, but requires considerable user input. Quality also comes at a price	7
IMODELLER 3D 2.5 WEB	Mac/PC	Image-based modelling software: creates 3D models for online use, in a Java-based format	£70* ($134*)	UZR	www.imodeller.com	58	Like the pro version but cheaper. With the right objects, this can produce quite impressive results. Wait until the release of version 3, which supports concavity	6
IMODELLER 3D 2.5 PRO	Mac/PC	Image-based modelling software: all-purpose app, exporting to a range of 3D file formats	£352* ($675*)	UZR	www.imodeller.com	58	Impressive and more powerful than its main rival, D Sculptor, it has too many irritations. It may be easy to learn, but it's quirky and frustratingly unstable	6
NUGRAF 4.1	PC	File-conversion software: powerful, with support for batch conversion and CAD data	£256* ($495)	Okino	www.okino.com	21	[Reviewed at version 4] This affordable package performs a demanding task exceptionally well and is relatively affordable. User interface is a tad dated	8
PARTICLEILLUSION 3	Mac/PC	Particle software: generates 3D-style effects in 2D. Niche, but used on many pro projects	£206* ($399)	Wondertouch	www.wondertouch.com	41	A fast, flexible alternative to conventional 3D particle effects, and fits well into production pipelines. Would be improved by more specific forces and user control	8
POLYTRANS 4	PC	File-conversion software: cut-down version of NuGraf. Lacks batch conversion facilities	£204* ($395)	Okino	www.okino.com	2	[Reviewed at version 1] Not your everyday 3D program, but a very useful one that all 3D artists should consider. Conversion doesn't always run smoothly	7
REALFLOW 3	Mac/PC/ Linux	Fluid-simulation software: the current market leader for realistic fluids; used in film projects	£620* ($1,200)	Next Limit	www.nextlimit.com	60	Sets the benchmark for power and controllability for fluid-simulation systems, but at a price. Still some stability and UI issues, particularly in the Mac version	7
STITCHER 4.0	Mac/PC	Photo-stitching: the leader in its field, though similar tools are now present in Photoshop	£299* ($580)	Realviz	www.realviz.com	50	Incredibly powerful and versatile. Not a quick solution, but stands above the competition in quality of results, although that quality comes at a price	7
STORYVIZ	PC	Previsualisation software: the latest in a new wave of previz and storyboarding apps	£1,858* ($3,600)	Realviz	www.realviz.com	60	Far more flexible and open-ended than simple storyboarding apps, and includes a timeline and keyframe animation capabilities. A serious investment, however	8

CONTACT US | Have we missed anything?

THINGS CAN CHANGE very quickly in the world of 3D software. If you've spotted an error in this buyer's guide, please contact us at the email address below. However, before writing in, please bear the following points in mind:

1. All prices exclude VAT and shipping, plus any optional extra costs, such as printed manuals or maintenance contracts.
2. Asterisks denote currency conversions from a list price at the current rate of exchange when the entry was added to the buyer's guide.
3. Due to limitations of space, not all sectors of the 3D market can be covered each issue. We aim to vary our listings from month to month.
4. Space also precludes us from listing the thousands of plug-ins currently available.
5. The verdict column contains a synopsis of our last published review. In most cases this will refer to the current version of the software. Where this is not so, it should be clearly noted.

**To notify us of an error in this buyer's guide, contact us at: 3dworld@futurenet.co.uk**

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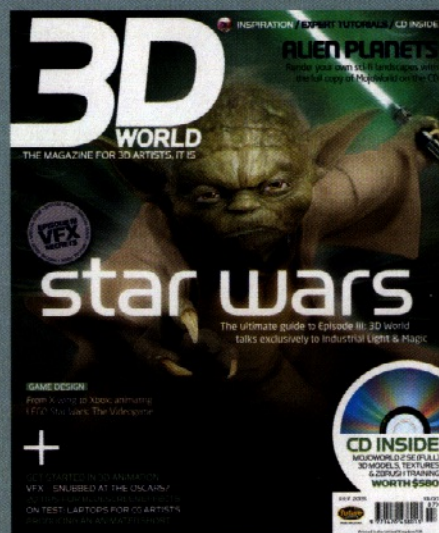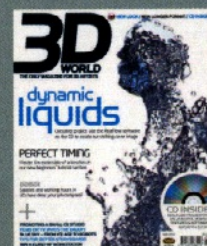
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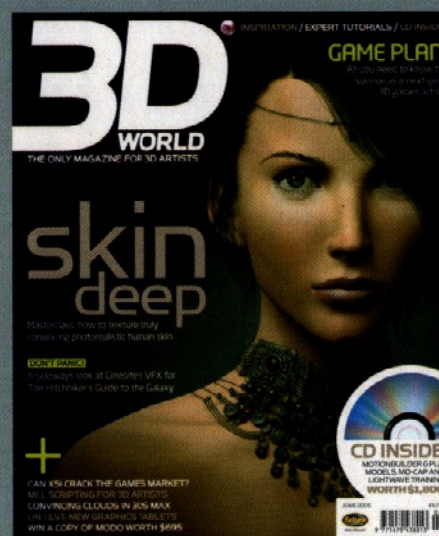
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studio profile

lumapictures

Useful information for 3D artists seeking work at visual effects companies. This issue: **Luma Pictures**

BASED
Santa Monica, California, USA

PREVIOUSLY WORKED ON
• *Sky Captain and the World of Tomorrow*
• *Windtalkers*
• *Underworld*
• *The Human Stain*
• *Rollerball*
• *Not Another Teen Movie*

HR CONTACT
Ian Noe, ian@luma-pictures.com

URL
www.luma-pictures.com

TYPE OF WORK UNDERTAKEN
Feature films and commercials

NUMBER OF FULL-TIME EMPLOYEES
40

TYPICAL NUMBER OF FREELANCERS
20-25

TYPICAL NUMBER OF FULL-TIME RECRUITS PER YEAR
10

LOOKING FOR USERS OF WHICH 3D SOFTWARE?
• *Maya*
• *mental ray*
• *ZBrush*
• *boujou*

KEY SKILLS FOR EMPLOYEES
Artists should be able to produce photo-accurate motion and imagery, along with the ability to be creative with emotive aspects of motion

DESIRABLE SKILLS FOR EMPLOYEES
Artists who are talented and well versed in more than one area, such as both modelling and texturing

A TYPICAL EMPLOYEE AT LUMA PICTURES IS...
Pleasant to work with, efficient, has a good eye, the ability to accurately interpret direction, and to learn quickly

CURRENTLY HIRING FOR...
Underworld: Evolution. Upcoming projects cannot be disclosed but are centred around CG creatures and environments

MAXIMUM LENGTH OF DEMO REELS
Four minutes, with the best work at the beginning

PREFERRED FORMAT FOR DEMO REEL SUBMISSIONS
Web – preferably a QuickTime of at least 320 by 240. There is no need to send a DVD or VHS tape as the first submission. The studio advises against VHS

3D WORLD

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BUSINESS END

Each issue, our panel of experts answers the legal and financial questions of freelancers and small studios. This month, we ask...

"Can I use their music?"

Q I'm putting together an interactive game and there are several pieces of music that I'd like to use. Some are existing recordings and others are versions of songs that I've re-interpreted and recorded myself. I thought I might need to clear the former but not the latter. Is this correct?
JENNIFER ASTLEY, VIA EMAIL

A In short: no. As with any other type of original artistic work, copyright comes into play here. However, unlike other sorts of work in which the rights can be straightforwardly determined - for example, screenplays - musical works have various layers of copyright. This is bad news, since it increases the number of legal hurdles for you to overcome.

But before you apply the following checklist to your situation, you ought to ascertain whether the works you want to include in your game are in copyright in the first place. In the US, a number of famous recordings are out of mechanical copyright protection. If this is the case, you'll be saving yourself a lot of trouble.

Copyright will only exist in a song or other form of music once it's expressed in a permanent form. Legally, this is known as 'fixation'. With contemporary music of most kinds, the author (writer) of the work is often the performer. Therefore, you'll need to consider that not only has the artist rights in the music itself (usually called 'publishing rights'), but they'll also have rights in the particular performance that you're using ('performer's' or 'performers' rights: note the difference in pluralisation). The publishing income is generally the more lucrative of the two, and therefore you ought to be just as wary, if not more so, of the songs that you have 're-interpreted' yourself. It isn't clear from your email how (or indeed why) you've re-interpreted these songs ,but in any event, to do so without the permission of the writer of the work will infringe their publishing rights and land you in trouble.

Separate from copyright in the music itself is copyright in the lyrics of any songs that you have reproduced. Assuming that they are themselves original, such lyrics are considered a literary work and they also attract copyright protection. So if the writer of the music and the writer of the lyrics are separate people, you run the risk of being sued by two people. Not fun. Also, be wary of copying 'just' a phrase or a few words from a song. Again, if it can be shown that there is copyright in the parts that you copy, your act of copying will be considered an infringement of the earlier original work.

Where you're copying an actual performance, you also need to be aware of the performers' rights mentioned above. The persons who recorded on the particular performance in question will own

rights in it. Therefore, you can't use a performance without first having obtained the permission of the performer in question.

If you're making an adaptation of a copyright work that you've cleared, depending on the extent to which you adapt the work, you'll be able to claim copyright in the new work (for example, if you re-work Tony Christie's '(Is This the Way To) Amarillo' into a thrash metal classic). Note that you'd still need to have obtained the permission of the copyright owner to use the words and music (assuming that they're in copyright).

And as well as the rights already discussed, there are also rights in the actual mechanical recording (often called 'production rights'). These are the rights that are granted to the person who mixes the track so that it becomes more than just words and music. Finally, there are what's called the 'moral rights' to consider: this is the author's right (i) to be identified as the author of the work (ii) to object to derogatory treatment of the work and (iii) to prevent false attribution of work. Therefore you'll probably want to avoid using S Club 7's 'Don't Stop Movin' as the background track to *PowerBabes Wrestling IV*...

Once you've identified the rights that you need to clear, the next question to answer is how you go about it. The MCPS-PRS alliance (consisting of The Mechanical-Copyright Protection Society and The Performing Right Society) should be your first port of call in the UK. The PRS collects payment for the public performance and broadcast of musical works and the MCPS collects payment in respect of the mechanical royalties. However, the use that you're suggesting is unlikely

DON'T MIX S CLUB 7 WITH POWERBABES WRESTLING IV

to fall into either category. You'd need to approach the relevant publisher/recording company to clear your intended use. Such use is likely to be based on a royalty payment, which means that you'd pay a percentage of the income that you derive from each download or sale of the game.

Finally, please don't be tempted to use sing-a-likes to create tracks that are similar to existing ones. The law of passing off (see Business End, Issue 66) is very likely to apply in such circumstances and you could find yourself digging deep to help fund a star's lavish lifestyle.

Lee Gage is an intellectual property solicitor at leading media and entertainment firm Harbottle & Lewis LLP. He advises creative businesses on all areas of IP and IT law issues
[w] www.harbottle.com

● **OTHER RESOURCES**
The MCPS-PRS alliance
www.mcps-prs-alliance.co.uk

The Recording Industry Association of America
www.riaa.com

The Musicians' Union
www.musiciansunion.org.uk

Equity
www.equity.org.uk

Government-backed home of IP on the net
www.intellectual-property.gov.uk

● **IMPORTANT NOTE**
This article is written in general terms and is not legal advice. Before taking any action on the basis of its contents, you should take specific legal advice. Neither *3D World* nor Harbottle and Lewis LLP will be responsible for the results of your acts or omissions that are made on the strength of this article

Making The Mantis Parable Part Two

Cyan Worlds' Josh Staub chronicles the highs and lows of creating an independent animated short, and assesses what lessons his experiences hold for others

IT WAS MID-SUMMER 2003, and *The Mantis Parable*, the animated short I was creating in my spare time, was ready to roll. I'd already storyboarded the film and put together a home studio for under $2,500, and was ready to begin production.

Storyboard in hand, I set about designing the mantis and the caterpillar, the two main characters in the film. I scoured the internet for insect inspiration but sometimes, reference material finds you, and one summer night while playing tennis with a friend, a very strange thing happened: mantises literally began falling from the sky! I grabbed an empty tennis ball canister, scooped a couple of the little green guys up and took them home.

I emptied them out on the breakfast room table, grabbed my DV camera and began filming. It was around this time that I solidified the style of animation in the film. I felt the film's visually realistic aesthetic required my 'insect actors' be more anatomically believable than traditional animated film characters, and with no dialogue to help convey the story, communication would be limited to their actions and movements. Mesmerised by the two real-life mantises interacting on my table, I felt confident that the story could be successfully told in this manner, taking a little artistic licence where necessary of course – insects in *The Mantis Parable* have eye-lids, features not found in the insect world...

PRODUCTION BEGINS

Production of the film began slowly, as I allocated only one or two late nights a week to working on it. This allowed me to spend evenings with my wife and two young children while continuing to move forward with the project.

I knew time would be a major limitation, so in an effort to keep things simple I resolved that the film would take place in a single setting – the bug collector's desk. However, each act would take place at a different time of day, allowing me to play with different

ONE SUMMER NIGHT, MANTISES BEGAN FALLING FROM THE SKY!

lighting situations to create moods that would enhance the plot. The desk area itself would be basic: a jar surrounded by a few interesting props to provide evidence of the bug collector's hobby. In addition to adding texture to the scene, these would frame the stage on which all the action would take place. Most props would be modelled and textured during the course of a single night of work. While arranging the items on the desk I toyed with different lighting scenarios and, based on my rough storyboards, tested out the camera angles required for the film.

I modelled both characters using polygonal subdivision techniques, allowing me to work with a simple 'cage' of geometry, instead of the hi-res versions. Each was modelled and textured in six to eight nights. Aside from the inherent complexity of the characters, setting up the animation rigs was laborious, due to my lack of character animation experience. One success was my primary the mantis rig, which contained a set of four dummy boxes that moved the feet individually. The mantis' torso proportionally responded to the position of the feet dummies, essentially propelling him automatically with every footstep. Eyelids and antennae were created as separate objects and linked to the head bones, the eyelids were animated using morph targets and the antennae provided secondary animation via *3ds Max*'s Flex modifier.

I decided to focus on creating an entire 'first pass' at 1,024x554 (1.85:1 aspect ratio), cut it together with music and sound, and then go back, tweak everything I could, and re-render the whole thing again at a higher resolution. This would help me avoid getting bogged down in any particular section – I knew I could always come back and fix it before the final rendering pass. This major decision would turn out to be a good one.

THE INTRO

The Mantis Parable was originally conceived as having three acts, the first of which I began to animate in late August 2003. Five months of slow but steady progress later, I had a completed a first
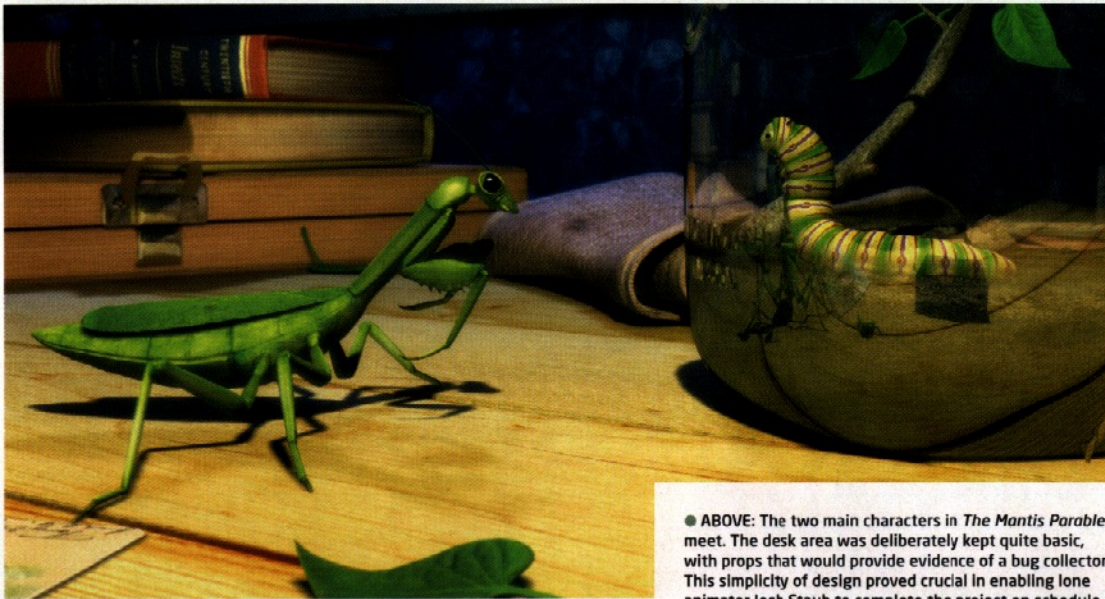
● **ABOVE:** The two main characters in *The Mantis Parable* meet. The desk area was deliberately kept quite basic, with props that would provide evidence of a bug collector. This simplicity of design proved crucial in enabling lone animator Josh Staub to complete the project on schedule

● **LEFT INSET:** Showing test footage to other people is an essential part of refining the structure of a short. Based on early viewer feedback, Josh added this introductory scene to *The Mantis Parable* to provide an explanation as to how and when the caterpillar found himself in the jar

● **BELOW:** A fully rigged version of the mantis character is available on this issue's CD, along with an exclusive clip of act two, with commentary recorded by Josh himself
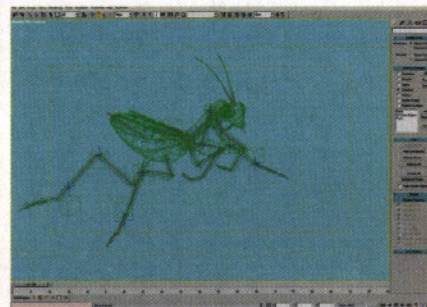
pass, which I showed to a handful of close friends and colleagues for input. While everyone enjoyed the work, I realised from their comments that I had made the mistake of convoluting a very critical element of the film which yielded the same question from almost everyone: "How did the caterpillar get into the jar?" That wasn't something I wanted the audience pondering while watching the film, so I came up with a simple introductory scene which showed the caterpillar being placed into the jar by the bug collector. It was January 2004, and I had already begun work on Act II, but realising the importance of the introduction, I dropped everything and went to work on it straight away.

Completing the introduction was a major milestone for me. Considering I was creating the entire film myself, it allowed me the chance to fully finish a section of the film early on in the production and, more importantly, provided a vehicle for setting the proper mood of the film visually, musically and aurally. The introduction consists of three camera pans of the desk during a stormy night while a stream of leaves flutter in through the open window; meanwhile a gentle, sombre piano theme (recorded with my newly

purchased Digidesign Mbox) accompanies the sound of rain and thunder. Without using words, the introduction scene aims to settle the audience into a thoughtful frame of mind.

After a month of working on the introduction, I had a polished piece of the film I could show to family and friends, and better yet: something to release on the internet. The day the introduction went live, it received a direct link from CG Channel which spawned an increase in website traffic, and therefore an escalation of inquiring and encouraging emails and guestbook signings. Later that summer, CG Channel approached me for an interview, increasing the deluge of well-wishers dramatically. *The Mantis Parable* had found an audience who eagerly awaited the completed film – just the motivation I needed to see the project through...

NEXT ISSUE: The complexities of Act II take its toll, but Josh finds new motivation to carry him through Act III to the end of the first-pass and finally, in a race against the festival clock while his home studio bursts at the seams, Josh aims to correct and re-render the final version of the film

SEE THE MANTIS PARABLE
● Updated festival screenings, a production diary and technical information relating to *The Mantis Parable* can be found online at the URL below. A fully rigged version of the mantis and an exclusive clip from Act I with a commentary can be found on this issue's CD
www.themantisparable.com

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INSPIRATIONS

SCEE's **Ian Shepherd** on a life-changing encounter with the art of Jaime Hernandez, father of the US alternative-comics renaissance

● Raw power: a cover image from Jaime Hernandez's *Love and Rockets*. "His economy of style is amazing," says Ian Shepherd. "There's never too much in a scene, but it's always interesting. In terms of composition, it's spot on."

"I FELL IN love with Jaime Hernandez's artwork the moment I saw it in the early '90s. If I had to describe *Love and Rockets* to a tabloid reader, I'd sum it up as 'buxom girls get it on in hot lesbo action'. If I was talking to someone more highbrow, it'd be 'spunky Latino chicks trying to survive the travails of love and work'. It was deviant, alternative and instantly striking.

But what really captured my attention was the artwork. I'd seen black-and-white comics, but this was different: it used a very clean line, no cross-hatching, and very bold composition. The beauty of it was that it looked so simple. I thought, 'I could do that, no bother.' At the time, I was working at the local benefits agency, but although I'd had no formal training, *Love and Rockets* gave me the desire to become an illustrator.

What's important about Jaime Hernandez's art is his clarity of line. You always get a sense of life and movement and direction – the same elements you try to capture when you're animating.

Early on, those characters seemed to me like your older sister and her really cool friends. You wanted to be part of the group, to spend the evening stage-diving, then puke up in a cracked toilet bowl. As I got older, I've lost touch with those people in the real world, so now there's a sense of nostalgia about *Love and Rockets* for me. But it brought me out of a dead-end job, and for that, I'll always be grateful."

Previously an illustrator, Ian Shepherd currently works at SCEE Liverpool where he is Lead Animator on *Formula 1* for PlayStation 3 [w] www.scee.com

SEE FOR YOURSELF
Back issues of *Love and Rockets* and a definitive new collection, *Locas*, are available from Fantagraphics [w] www.fantagraphics.com

Vue 5 Infinite
Exclusive trial version

PC/MAC Exploit EcoSystems technology to design and populate your own organic-looking landscapes

THIS EXCLUSIVE TRIAL version of *Vue 5 Infinite* is not available to download anywhere online until 31 June, meaning you can get a two-week head start to go about 'healing the world' with the wondrous technological advancement that is EcoSystems.

This revolutionary object duplication and scattering tool enables you to replicate an object and populate your scenes with billions of polygons with no let-up in the performance of the program. Using simple parameters, it's easy to vary the scale, orientation and colour of the objects to give the impression of randomness and variety associated with the real world.

On page 58, you can find an in-depth tutorial in which Eran Dinur explores the merits of EcoSystems and shows how to create a lush, sprawling jungle terrain that looks equally as convincing onscreen as it would if you were standing on the banks of the Amazon! *3D World* readers can also claim a special £70 ($100) discount on the full version of the software. For more details, see page 62.

To register the software, you'll need to obtain a serial code from **www.e-onsoftware.com/Products/vue5infinite/trial/**. Once registered, the trial will work for 60 days. Note: this trial version is save-disabled and has certain rendering and content restrictions. For a full list, see the CD interface.
www.e-onsoftware.com

FACTFILE

FORMAT
PC / Mac

MINIMUM SYSTEM
Windows 2000 / XP or Mac OS X 10.3, 1.5GHz PIII or 1.25 GHz G4 processor, 512MB RAM, 100MB HD

DEVELOPER
e-on software

WEBSITE
www.e-onsoftware.com

USING THE CD

GETTING STARTED
On a PC, this CD should auto-run when inserted into your CD drive. If not, run 3dw.exe. To toggle autorun on and off, use the Control Panel on your computer. On a Mac, choose 3DWiClassic or 3DWiOSX to suit your operating system.

USING THE INTERFACE
The disc interface requires Windows 98, Me, 2000, XP or Mac OS 8+. You'll also need an active internet connection to make full use of the interface. For best results, ensure you're using a version 3 Web browser or better.

POINTS TO NOTE
• Some software may require free registration over the internet or by phone
• Some software may not be available in all territories
• Values quoted are the original prices for which the software was sold (including packaging and manuals).

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www.realviz.com

FACTFILE

FORMAT
PC / Mac

MINIMUM SYSTEM
Windows 2000 SP2 / XP or Mac OS X 10.2, 500MHz Pentium III or G4 processor, 256MB RAM, 100MB HD

DEVELOPER
RealViz

WEBSITE
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www.medievalworlds.com

FULL CD CONTENTS | What's on the 3D World disc this issue

LEAD CONTENTS
VUE 5 INFINITE (TRIAL)
IMAGEMODELER 4 (TRIAL)
MODELS WORTH $750
For full details, see facing page

VIDEO TUTORIALS
LIGHTING IN LIGHTWAVE
A supplementary 13-minute training video on faking area lights in LightWave, produced for the 3D World CD by KURV studios. The company provides competitively priced video training aimed at everyone from new users to seasoned pros, recorded by leading artists in their respective fields. Note: QuickTime is required to view this movie
www.kurvstudios.com

OTHER RESOURCES
82 TEXTURES
High-resolution JPEG images from morgueFile suitable for use in commercial projects. The set includes a range of assorted stock imagery. Note: the textures are not pre-tiled
www.morguefile.com

CD MISSING?
For a replacement, please contact your newsagent

BODYPAINT 2 DEMO
Two trial versions of Maxon's 3D painting package (both standalone and integrated with *Cinema 4D*) for use in our tutorial section this issue
BodyPaint tutorial: page 40

SUPPORTING FILES
Full-sized screenshots, project files and other resources to accompany the tutorials and Q&As printed in the magazine this issue
Magazine contents: page 4
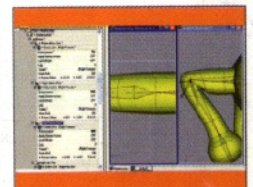
TROUBLESHOOTING

THIS IS A FUTURE TECHNOLOGY CD-ROM. This disc has been thoroughly scanned and tested at all stages of production, but – as with all new software – we still recommend you run a virus checker before use and have an up-to-date backup of your hard drive. While every effort has been made to keep this CD virus-free, Future Publishing Ltd cannot accept responsibility for any disruption, damage and/or loss to your data or computer system that may occur while using this CD or the programs and data on it. Consult your network administrator before installing software on a networked PC.

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